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## COMMUNICATIONS

# THE WORLD-WIDE DISTRIBUTION OF TRACHOMA

**excluding the Dominions, Colonies and Mandated Territories of Great Britain**

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### Introduction

THE incidence of trachoma in the Dominions, Colonies and Mandated Territories of Great Britain has been considered elsewhere.* The present dissertation is directed to the distribution of the disease in other parts of the world. It is an attempt to place before ophthalmologists in readable form an approximate estimate of the high degree of trachomatisation which exists throughout the world.

The diagnosis of trachoma when there are naked-eye cicatricial changes in the conjunctiva and obvious vascularisation of the cornea is easy. However, there may be obvious pathological changes in the conjunctiva, in which it is impossible to make a certain diagnosis in the absence of a careful examination with the slit-lamp.

* *Brit. Jl. Ophthal.*, p. 625, November, 1934.

It is obvious that in distant parts of the world a slit-lamp examination is impossible. Therefore all statistics of examinations of eyes for trachoma are grossly under-estimated.

It is necessary to appreciate the fact that an individual may be trachomatous, while oblivious of any ocular discomfort, another reason for under-estimation.

Authority for the information given has been found in the Reports of the XIIIth,* XIVth and XVth Concilia Ophthalmologica, La Revue Internationale du Trachome, a Report by Dr. Mackenzie, of the League of Nations Health Section, the Ophthalmological Journals of various countries, the Annual Reports of the Director of Health of Palestine, the Annual Reports of the Ophthalmic Section of the Ministry of Health of Egypt, many private communications from trachomatologists and MacCallan's Trachoma (Butterworth, London, 1936). Specific references to articles and to authors have usually been omitted to avoid burdening the text.

I regret that I have been unable to obtain information as to the trachoma incidence in the countries named as follows:—Afghanistan, Albania, Abyssinia, Colombia, Costa Rica, Haiti, Honduras, Liberia, Nicaragua, Panama, Paraguay, Salvador, San Domingo, Siam.

Any corrections or additions will be received by the author with gratitude.

## Contents

America, United States of, Philippines; Arabia, Yemen; Argentina; Armenia; Baltic States, Latvia, Esthonia, Lithuania; Belgium, Belgian Congo; Bolivia; Brazil; Bulgaria; Chile; China, Mongolia, Tibet, Manchuria; Cuba; Czecho-Slovakia; Ecuador; Egypt; England; Finland; France, Morocco, Algeria, Tunisia, Central Africa and Madagascar, Syria and Lebanon, Annam, Antilles, New Hebrides, Caledonia, Tonkin, Cochin-China, Pondicherry; Germany, Austria; Greece, Ancient and Modern; Guatemala; Holland, East Indies, Guiana; Hungary; Iceland; Greenland; Iraq; Ireland; Italy, Cyrenaica; Japan, Korea, North China; Luxembourg; Mexico; Nepal; Norway, Sweden, Denmark; Oceanea, Polynesia; Persia; Peru; Poland; Portugal, Madeira; Rumania; Russia, U.S.S.R.; Scotland; Spain; Switzerland; Turkey; Uruguay; Venezuela; Wales; Yugo-Slavia.

* Special mention should be made of Wibaut's Mappa Mundi which introduced the subject of trachoma at the XIIIth Concilium Ophthalmologicum.

## UNITED STATES OF AMERICA.

Among the authorities for the trachoma problem among the indigenous white population of the zone of the United States of America, where trachoma is endemic, are McMullen and Rice of the Public Health service.

As a contrast to the conditions in Europe, where enquiries as to the incidence of trachoma often refer to the larger towns, in the United States the problem is more especially concerned with the mountainous and arid regions. Until recently these parts could only be reached on foot or on horse-back, but now roads fit for motor transport are being constructed.

The endemic zone extends over more than a hundred thousand square miles, or a quarter of a million square kilometres, and contains nearly four million inhabitants. The total area of the states affected is half a million square miles. The zone extends from the East towards the West through Virginia, Kentucky, Missouri, Arkansas, Oklahoma, New Mexico and Arizona.

The trachoma incidence in these regions, as noted by obvious physical signs, varies from 4 to 17 per thousand, although not so stated by the authors of statistics, it is clear that the actual incidence of trachoma is very much greater than this.

In Kentucky out of 8,444 patients examined 463 eyes were found to be blind, and 840 persons had suffered a reduction of visual acuity to counting fingers at 6 metres as the result of corneal lesions.

In the states of Missouri, Tennessee and Kentucky out of 15,450 patients examined 1,835 had been subjected to operation for entropion. About 12 per cent. of the trachomatous patients seen in Missouri had visual acuity reduced in both eyes to counting fingers at 2 metres (20/200).

The clinical descriptions given above denote a very much higher incidence of trachoma among the population of the affected states than that given by McMullen and Rice.

In the southern counties of Illinois trachoma has been known for at least 45 years according to Gradle, who is an honorary director of a campaign carried out by the Illinois Society for the Prevention of Blindness at the expense of the State. Within this area there were in January, 1938, 3,070 well marked cases of trachoma and 225 doubtful cases. Five out-patient clinics were established for indigent sufferers, about 30 miles apart. To each clinic was assigned a graduate nurse trained in ophthalmology, all under the supervision of a full-time and well-trained ophthalmologist, Dr. de François. With the careful treatment used it was found that a period of from four to twelve months was required to make the change from an active to a quiescent trachoma.

The trachoma problem among the Indians of the South-West has been closely studied by several distinguished observers including Posey, Wilder, Knapp and Proctor. Their inspections included the reservations in Oklahoma and the boarding schools in New Mexico, Arizona and California.

Of the 35,000 members of the Navajo tribe it is probable that rather more than 25 per cent. are trachomatous. The majority live in hogans or cabins which are badly ventilated and do not offer hygienic facilities. Many members of the tribe are shepherds, and when caring for their flocks are exposed to the extremes of heat and cold in summer and winter, and to the irritating dust of the desert, and have scant facilities for bathing or cleanliness. These tribesmen live as close to nature as possible in a beautiful region, but which is ill-favoured for the support of human life.

The observers mentioned above recommended that trachomatous children should be segregated in special schools from the healthy children, and that their eyes should receive continuous treatment until they can be pronounced cured and no longer capable of infecting the eyes of others. In Posey's opinion "the compulsory education of children, admirable and necessary as it is, has been the chief cause of the increase of trachoma among the Indians in recent years. It has been the bringing together in close contact in the boarding schools of children with the disease who, under the old system of tribal life, led a more or less isolated existence and consequently were less likely to give the disease to others."

The boarding schools " are housed in large buildings provided with spacious playgrounds. The dormitories are roomy and airy, and each pupil has a separate bed on which the linen is clean. The children wash under running water and dry themselves on individual towels. The pupils appear well nourished, active and happy. Many had trachoma and from our investigations it was apparent that, notwithstanding the sanitation of the schools, the disease is propagated there and that some pupils who enter in the autumn with unaffected eyes return to their homes in the summer with trachoma."

These observations were made by Posey (*Jl. Amer. Med. Assoc.*, May 21, 1927, p. 1,618), and on account of their value are included here. Conditions have no doubt improved since they were written, but according to the Sight-saving Review for 1935 (September, p. 196), the children in the Indian Schools of Arizona and New Mexico are infected to the extent of 40 to 50 per cent., while the adults only to the extent of 27 per cent. The Indian population was 78,000. So it does not look as if great progress had been made, in spite of the efforts of the Public Health Service.

However, it may be stated quite definitely that eradication of trachoma from a mass-infected population is one thing, and the alleviation of the effects of the disease with preservation of good visual acuity is another. Eradication of the disease can only be effected by general sanitary means, such as provision of a good water supply, improvement of the housing accommodation, the provision of a drainage system, and adequate nourishment of the population. Alleviation of the effects of the disease can be effected by the provision of ophthalmic hospitals in the country districts.

In Southern Illinois, Gradle and de François examined 2,173 consecutive cases of trachoma in order to determine the extent to which sight was affected. They found that 7·8 per cent. had suffered a reduction in vision in the better eye, as the result of trachoma, to less than 20/200 (*i.e.*, 6/60), and so were industrially blind. However, under treatment 26·1 per cent. improved to vision of better than 20/200. All the patients were Caucasians who had been more or less inbred for more than a century, who were mostly country-dwellers, and whose ideas of sanitation were very rudimentary.

### PHILIPPINE ISLANDS.

The Philippines are a group of 7,083 islands belonging to the United States. They have an area of about twice the size of England, and a population of more than ten million. Trachoma is very common, though not universal.

### ARABIA AND YEMEN.

Experience has shown that, like the occurrence of gold in mines, trachoma often occurs in pockets, being unevenly distributed. Therefore, to make a careful examination of the eyes of a number of men, women and children in a few towns and to state that the incidence of trachoma is the same for the whole country is likely to be erroneous.

Galal and Hindawy, who are Egyptian oculists of experience, spent a month at Mecca, the Holy City of Arabia, in 1926. They found that the indigenous inhabitants were free from trachoma, almost without exception. Those who were trachomatous had sojourned in other countries, such as Egypt, Palestine, Syria or Mesopotamia where trachoma is practically universal. But among the ranks of the Army of Nejd, which was occupying the City, trachoma was almost universal. Nejd is an emirate of Central Arabia, extending eastwards from Mecca towards the Persian Gulf. It consists mainly of a plateau, where rain is prevalent, and consequently where there is cultivation. There are frequent

high winds and sand-storms. Mecca, however, lies in a valley, which is very warm in winter and unbearably hot in summer. There is practically no rain, and absolutely no cultivation. The extremely limited water supply is brought in pipes from a distance of twenty miles.

There is no racial distinction between the inhabitants of Mecca and their neighbours of Nejd. The authors are unable to offer an entirely satisfactory explanation of the apparent immunity of the Meccans, for the town has been visited annually for centuries by thousands of pilgrims from trachoma-stricken countries.

I record this as an instance of the occasional pocket-like absence of trachoma in a section of a vast area where the disease is common.

Trachoma is far less prevalent in Yemen or Southern Arabia than in Egypt, Palestine and the rest of the Middle East according to Sinai. It follows a milder course and is not found in infancy. Most of the Yemenite Jews immigrating to Palestine leave their homes with healthy eyes and become infected, especially the children, on their way to, or in Palestine itself. Contrary to the accepted idea of the frequent infection of children by their mother, this mode of infection occurs only in 10 per cent. of the Yemenite families observed. About 20 per cent. of trachomatous patients are infected in their second year, 40 per cent. in their third year, and the remainder later in life.

## ARGENTINA.

According to Demaria in an article dated May, 1936 (Revista de Ophthalmologia de S. Paulo), there is a good deal of variation in the incidence in different parts of the Republic. The greater incidence is in unhealthy ranches such as those in the district of Caceres where 50 per cent. of the inhabitants are trachomatous. At the medical examination of army conscripts coming from the province of Santiago del Estero 13 per cent. showed active trachoma, and 55 per cent. trachomatous scarring of the conjunctiva.

The disease may therefore be said to be very common in this country. It is claimed that the disease has been brought from the Old World by immigrants, and is not autochthonous.

## ARMENIA.

Some years ago a medical man, describing himself as a citizen of the United States of America, called upon me in London, and informed me that he had been working with a Mission Hospital

in Armenia. I understood that he was an oculist, or at any rate that he had interested himself in the medical work of the Mission which was concerned with the treatment of eye disease and especially of trachoma. He desired to have information on the diagnosis and treatment of trachoma, with which, he stated, the Armenians were all infected.

I lent to him my first book on trachoma, " Trachoma and its Complications in Egypt," which he did not return.

I have always understood that in Armenia there was mass-infection with trachoma, and the interview with this person confirmed my opinion.

## BALTIC STATES.

According to Grönholm the percentage of the population who suffer from trachoma in Lithuania is about 10, and the average percentage of ophthalmic hospital patients who exhibit signs of the disease is 22.

In Latvia 6 to 7 per cent. of the rural population of Courland have trachoma, and 35·5 per cent. of the hospital patients.

In Esthonia 4 per cent. of the population have trachoma and about 10 per cent. of the hospital patients.

In Lithuania at the towns of Prudzin and Lygumu 15,000 of the inhabitants were examined and showed a trachoma incidence of 39·9 per cent. Avizonis states that in 49·7 per cent. of the blind population the cause is trachoma. In some of the towns 29 to 59 per cent. of the inhabitants are trachomatous. Children under one year of age frequently require treatment for the disease.

## BELGIUM.

Coppez and van Duyse state that trachoma has been on the wane in Belgium for the last 50 years, for in civilised countries trachoma is a malady of the poor, it survives among those debilitated by undernourishment and exceedingly hard labour. In recent years workers have had better pay, better nourishment, better homes, and shorter hours of labour. These are important causes for regression of the disease.

According to Hubin and Hubert there was an increase of trachoma in one part of Belgium in 1930 to 1932, that is in the neighbourhood of Liége. There are many foreign labourers who have been noted to be trachomatous; and in some of these cases it has been shown that their infection occurred in Belgium. It is also true that some Belgians have been infected by foreign labourers, and it is by these latter that trachoma is disseminated.

### BELGIAN CONGO.

In the province of Katanga of the Belgian Congo, Dixon, during a visit, found 37 of the patients who presented themselves for the treatment of eye disorders, to be affected with trachoma. More than a third of these had trichiasis and entropion as the result of cicatricial changes in the conjunctiva and tarsus. It is stated that the disease is highly localised, one village may be heavily infected and the neighbouring one free from the disease.

### BOLIVIA.

The incidence of trachoma is unknown, but is believed to be slight.

### BRAZIL.

Brazil is an enormous country of over three million square miles, through which the equator runs. Brazilian oculists believe that trachoma has been imported by immigrants, since in the five years up to 1930 71,000 Poles, Roumanians and Lithuanians, as well as 52,000 Japanese, practically all of whom were trachomatous, entered the country. There are now adequate immigrant restrictions.

Dr. Alvaro of Santo Paulo, who is Health Officer as well as Assistant Professor of Ophthalmology, has given me some information as to the State, which contains eight million, and as to the City, which contains one and a quarter million inhabitants. The land is very dusty, being formed of decomposed iron soil. Mosquitos of the genus Chironomidae abound; their larvae live in the dust; they certainly transmit acute conjunctivitis, and trachoma appears to succeed the acute inflammation. Sanitary conditions outside the City are poor. Children are infected early. Ophthalmia neonatorum is common, but acute conjunctivitis complicating trachoma, causing ulceration of the cornea and leading to blindness is not common.

There are apparently zones in the Republic where trachoma is universal, others where there is a 30 per cent. incidence, while Dr. Alvaro states that among eye patients in Santo Paulo City the incidence is about 15 per cent.

While it has been believed by most writers that trachoma has been introduced into the State of Sao Paulo since 1889 by immigrants, Busacca believes that it has been present since the time of its discovery by the Portuguese in 1500. There is no means of knowing whether the disease was present among the indigenous inhabitants of the country or whether it was introduced by the conquerors who came from a trachomatous country.

At any rate in the Elzevir edition of a work by Guglielmus Piso, published in Amsterdam in 1648, there is a reference to the frequency of eye diseases in Brazil: "Inter Brasiliae enim calamitates haud postremum locum sibi vendicant oculorum mala, milites, quae ceteris et penuria pressos sparsim non gregatim infestant, vivendi facultate vitiata et corrupta."

The country districts are much more heavily infected than the towns, owing to the very inferior conditions in which the country folk live.

## BULGARIA.

Trachoma is wide-spread in Bulgaria, where great interest in the pathological aspect of the disease is taken by Pascheff and others. No pretence has been made at evaluating the trachoma incidence, at which I rejoice, for extraordinarily inaccurate results have been obtained in countries where this has been done.

## CHILE.

Trachoma has only been known in Chile since 1881, when it was introduced by immigrants: its extent is unknown. It is rarely found among native Chilians, and never in the upper classes.

## CHINA, MONGOLIA, TIBET, MANCHURIA.

According to ancient documents it appears that trachoma existed already in China during the reign of the Emperor Huang Ti, who flourished 2,679 years B.C. However, it is understandable that precise descriptions of the disease were not written until during the dynasties of the Emperors Tang and Ming in the fourteenth century of our era.

It is especially prevalent in Northern China, and many trachomatologists believe that the disease had its origin in Mongolia. Throughout the whole of this vast area, partly thickly populated, and partly uninhabited, it is believed that there is an incidence of 33 per cent. Those who are conversant with the epidemiology of the disease would probably guess that in thickly populated areas the disease is universal, but would express no opinion of the conditions among inhabitants of desert regions.

Pillat and Howard agree that in China trachoma is a menace to the population. It is suggested that 20 per cent. of the inhabitants of South and West China, and 40 per cent. of those of North China are afflicted. Fortunately, however, the trachoma is a relatively mild disease.

In order to obtain any control of the disease by treatment it

would have to be mild, because the Chinese regard with equanimity any disease which may befall them, and because they have an ingrained distrust of western medicine.

In a letter, dated April, 1937, Dr. Kronfeld, the ophthalmologist at Peiping Union Medical College, states " roughly 95 per cent. of all the patients seen at any of the departments of the P.U.M.C. have trachoma. The patients who apply for admission to the eye clinic practically never do so on account of trachoma. Trachoma is, on the whole, a mild disease here, and it is only the awful methods of treatment used by the Chinese quack which lead to extensive tissue destruction."

### CUBA.

According to Yarr four white men and seven Chinese are seen in Cuba to be suffering from trachoma to one negro. This observation was made in 1899, but the fact that there are Chinese in Cuba makes it pretty certain that the disease is not negligible.

### CZECHO-SLOVAKIA.

Of the four provinces of Czecho-Slovakia, Bohemia, Moravia, Silesia and Slovakia it is the last-named which exhibits the highest incidence. According to Bruckner of Prague the infection was imported from Hungary by Slovak labourers who returned home from harvesting in Hungary.

There are 30 trachoma stations under the charge of 23 doctors and 27 nurses who are trained at the ophthalmic clinic of Bratislava (formerly Pressburg or Pozsony).

Trachoma increased very much during and after the War, especially in Slovakia. Since 1925 a series of clinics has been organised under Government auspices; each is in charge of a medical man who has assistant medical officers and sisters; the latter visit the homes of those who require treatment and see that it is applied.

### ECUADOR.

Trachoma is a rare disease in Ecuador.

### EGYPT.

The trachoma incidence in Egypt may be judged by the fact that in 1936 less than 1 per cent. of the pupils in the Government Schools, numbering more than ten thousand, were free from the disease in an active or cured stage.

There is indeed a complete mass infection throughout the country. Under these conditions it can only be by exceptional

care or by exceptional luck that any child does not become infected during the first year of life.

It is clear that the intensive campaign against trachoma which was commenced under my direction in 1903 has done little to reduce the incidence of the disease. It has, however, had an extraordinarily important effect in reducing the amount of blindness resulting from acute ophthalmias and from the sequelae of trachoma. The vast system of treatment by the application of medicaments and by operation carried out by ophthalmologists at all the Government Primary Schools leads to a much earlier cicatrization of the trachomatous conjunctiva. In 1914 only 66 per cent. of the boys in the school exhibited clear corneae, while in 1934 95 per cent. had both corneae clear; while the visual acuity *without glasses* was satisfactory and as follows:

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|---|---|
| 6/6 or 6/9 in each eye ... ... ... | 57·77 per cent. |
| 6/6 in one eye and 6/18 or better in the other ... ... ... ... | 20·37 per cent. |
| Less than either of the above standards | 21·85 per cent. |

Among the upper classes of the Egyptians it is now quite common to find that the children of the family are non-trachomatous, which thirty years ago would have been a very unusual phenomenon.

## ENGLAND.

The actual incidence of trachoma in England is unknown. It is not recognised in many cases even by ophthalmic surgeons. On occasion trachoma may affect persons of any rank of life. During the last few years I have had under treatment for this disease two medical men, neither of whom has ever been out of England, nor to his knowledge has seen a case of trachoma; two girls from expensive schools; two boys from high-class preparatory schools; one boy from a public school in Ireland, the son of a distinguished medical man in London.

In November, 1936, I obtained information from 44 London hospitals, either ophthalmic hospitals or hospitals with ophthalmic clinics, as to the number of cases of trachoma recognised and treated during the preceding twelve months. They amounted to 457.

The number of trachomatous children admitted to the London County Council Trachoma School (White Oak) during the year 1937 was 28.

At the Liverpool hospitals during the same period only 25 patients were diagnosed as being trachomatous, a small number when one considers the proximity of this port to Ireland, and its large Irish population.

On hearing that 4,000 children from parts of Spain where trachoma is prevalent were about to be brought to this country a joint letter was sent by the President of the Royal Society of Medicine (Sir John Parsons) and myself to the Minister of Health, dated May 15, 1937, pointing out the danger of causing trachomatous infection among the children of England. However, no notice was taken of this warning and the children were boarded out in many different districts in England. A considerable increase in the trachoma incidence may be expected during the next year or two.

I had an opportunity of seeing only one of these children from Bilbao in October, 1937. Trachoma had been diagnosed by Mr. Myles Bickerton, F.R.C.S., and by Mr. L. H. Savin, F.R.C.S., and I was able to confirm their diagnosis.

## SCOTLAND.

Glasgow, with its large Irish population, appears to be the only place in Scotland where there is any trachoma. This city is also unique, in that trachoma is a notifiable disease. In the year 1935 16 cases were notified, and there were 130 cases on the register. However, at the Trachoma Dispensary 185 patients were attending, and the average number of their attendances was 23. Cases needing operation are transferred to Stockwell Hospital under Dr. Meighan.

## IRELAND.

In Ireland trachoma may be said to be an occasional disease with heavy local infections. Lavery found that 23 per cent. of the girls in an institution in County Cork were trachomatous. It is in institutions or in boarding schools that the disease is especially spread. Many of the cases seem to be of a mild type, those affected suffer very little disability, and nothing wrong with the eyes may be noted until after eversion of the lids.

It is probable that if Lavery had been able to examine the girls in the institution referred to above with the illumination and magnification of a slit-lamp that the percentage of those infected would have been very much higher. However, it is obvious that if an oculist travels a long distance to examine school-pupils, he has only a limited amount of time, and he cannot take his slit-lamp with him.

## FINLAND.

Our authority for the occurrence of trachoma in Finland is Grönholm. In this independent sovereign state, with its sixty million acres of forest land, the disease was formerly all-pervading.

In the sixties of the last century 36 per cent. of all the patients in the eye hospital at the capital, Helsingfors, were under treatment for trachoma. A hundred years before that date it was stated "that the inhabitants in the interior of the country owing to the smoke from the open fires and from the wooden torches used for illuminating their chimney-less dwellings lose their noblest and most necessary faculty, their eye-sight, so that they become invalids or entirely blind. The smoke causes an increased 'affluxus humorum' so that the eyes begin to water and there are repeated ophthalmias, with the result that many people when they are 30 or at the most 40 years old, are unable to read, and when they are 50 have had their sight reduced to such an extent that they cannot work on their farms."

However, since this far-off time the disease has very greatly diminished so that now there are no more than about seventy thousand persons suffering, or rather more than 1 per 1,000; this estimate was given by Grönholm for the year 1924. However, there were two periods during which the trachoma incidence markedly increased: Grönholm suggests that this was due to a periodical fluctuation in the virulence of the contagion, as there is no reason to suppose that the general cultural and hygienic standard of the country was any lower during these periods (1873 to 1875 and 1880 to 1899) than just before or later.

## FRANCE.

It is impossible to obtain from the various sources of information any distinct idea of the incidence of trachoma in France as a whole. In 1929 Professor Aubaret stated that 15 per cent. of the patients at the ophthalmic clinic at the Hôtel Dieu at Marseilles were trachomatous, at which town it appeared that there were 6,000 or 7,000 children in the schools suffering from trachoma. Marseilles is a great port at which there is a great influx of infected Syrians, Algerians and unfortunately of French-born persons who have become infected in the colonies of France. At the trachoma clinics in 1926 there were 395 new cases and 3,786 old cases.

At the Paris Hospital de Lariboisiére 1 per cent. of the new patients are trachomatous, that is about 210 persons a year, the majority of whom were not born in France.

On the French Mediterranean coast there is a considerable amount of trachoma, as there is in the whole of Southern France. Even at Bordeaux 1 per cent. of the patients at the ophthalmic clinic of Lagrange are trachomatous.

Corsica enjoys complete mass infection with trachoma.

In the provinces of Bas Rhin and Haut Rhin, formerly Alsace,

there is very little trachoma. Redslob of Strasbourg made an interesting observation on this point. He stated that about three hundred thousand Alsacians were conscripted into the German armies during the Great War. Of these at least two-thirds were sent to the Eastern front for political reasons, where they were billeted among Polish, Lettish, Lithuanian and Ukrainian families. As is very well known their hosts are heavily trachomatised. Nevertheless Redslob, who is an ophthalmologist of long experience, carefully examined the medical reports of all Alsacian soldiers who returned and claimed a pension on account of wound or sickness, has only been able to find three units who contracted trachoma while sojourning among a heavily infected and rather dirty population. While in Redslob's opinion this was due to some degree of immunity to trachoma among his fellow countrymen, it appears to be more likely that it was due to their extremely cleanly habits that they avoided contagion.

In the province of Moselle, formerly Lorraine, there is a highly industrialised population which is augmented by the influx of Italians to work in the mines. While there is no doubt that there was a certain amount of autochthonous trachoma this has been increased by infected immigrants.

## MOROCCO.

In Morocco there is mass infection of both Mohammedans and Jews. About 4 per cent. of the European population are also trachomatous. A considerable amount of anti-trachoma treatment and propaganda is being carried out as described by Pages, Roques and others. There is the same amount of superimposed bacterial infection as in Egypt, Palestine and Tunisia, and the same difficulty in preventing the infection of non-trachomatous persons.

Contrary to the experience of trachomatologists in Tunisia, Delanoe considers that the schools form important foci of infection.

## ALGERIA.

Between the latitudes 30 and 34 degrees North 1,724 of the indigenous inhabitants were examined. 74·4 per cent. of the sedentary tribes, 51 per cent. of the semi-nomadic tribes and 7·6 per cent. of the nomadic tribes were found to be trachomatous. More than half of the total became infected during the first five years of life. The cases of cured trachoma (MacCallan's Stage IV), amounted to 44·3 per cent. About 1 per cent. were completely blind, and 5 per cent. were half-blind. It does not appear that flies were responsible for the infection, which occurred through direct contact.

In 1923-24 Toulant examined the pupils in 24 different schools in Algeria. He found that 22·3 per cent. of the Europeans, and 57 per cent. of the natives were trachomatous. Toulant particularly notes that he enumerated as trachomatous only those who presented " lesions tout à fait nettes."

It is a disquieting fact to learn that so many of the European children are trachomatous; as for the natives it may be said that if a strict examination was made, including biomicroscopy, it would be the exception to find any one of them free from any sign of trachoma.

In Algeria the question of incorporation of trachomatous conscripts in the Army has been carefully considered. It has been established that many young men neglect all treatment for their eyes in the hope of escaping military service, and even that some inoculate their eyes from persons suffering from acute conjunctivitis. In order to prevent depletion of the full complement of recruits, trachomatous men are taken, provided that there are no complications.

There are certain difficulties in this arrangement; for instance it is necessary to have special trachomatous units and to afford treatment, just as there are " favus " units; also difficulties may arise as regards pensions for soldiers who become disabled on account of their eyes.

The observations of Toulant on some of the complications of trachoma are of interest. The superimposed Koch-Weeks conjunctivitis is much more severe than the non-trachomatous inflammation due to this organism which is met with in Europe; in fact it resembles gonococcal conjunctivitis in its severity. In Algeria gonococcal conjunctivitis is infrequent.

The social organisation for the treatment of ocular diseases must be different from those which have been found to be of value in Egypt on account of the vast area of the country, the defective means of transport and the minimal budgetary credits allotted for this purpose.

An elaborate scheme for a trachoma campaign in Algeria has been put into force recently by the Governor-General on the advice of his Inspector-General of Health, Dr. Lansnet. A full description of this has been published by the International Association for the Prevention of Blindness, 66, Boulevard Saint-Michel, Paris. It will be of great interest when an account can be given after the scheme has been in operation for some years.

## TUNISIA.

The French protectorate of Tunisia is an area about the size of England. It has the distinction of being the seat of the earliest experimental work on the aetiology of trachoma, which was carried

out at the Pasteur Institute of Tunis by Charles Nicolle and Cuénod. While there may be as small an incidence as 10 per cent. in the North, this rapidly increases towards the South and reaches 95 per cent. in the oases. The great authority for Southern Tunisia is Talbot, who for a long time has been carrying on admirable and self-sacrificing work among the natives and especially in the schools. In the North it is unfortunately the case that children of French officers are frequently infected.

## CENTRAL AFRICA AND MADAGASCAR.

Some parts of the French Possessions in Central Africa are heavily stricken with trachoma. Starting from the equator and proceeding northwards towards the desert this vast area may be divided into three zones, pre-equatorial, savannas and pre-Saharian. It is in the pre-Saharian zone that the disease is most prevalent.

The whole of the caravan-route between Lake Chad and the Congo River is highly infected; there seems to be a particularly black spot in a small region situated in the angle between Lake Chad and Nigeria, where Jamot examined 29,366 natives, many of whom were trachomatous and of whom about 700 were blind in one or both eyes.

According to Motais trachoma is a rare disease in French Guinea, the Ivory Coast, Dahomey and some parts of the Cameroons.

In Madagascar, up to about 1910, no trachoma had been signalised, but since 1920 this island, which is about four times the size of England and Wales, has become pretty thoroughly infected through the agency of Indian traders.

## SYRIA AND LEBANON.

Throughout Syria and Lebanon it is the exception to find any native unaffected with trachoma.

There is now a Lebanese Republic, the inhabitants of which vary both in nation of origin and in religion. Those whose financial condition enables them to live under slightly less repulsive conditions of hygiene have a somewhat lower incidence of trachoma than their more wretched neighbours.

The immigration of 20,000 Armenians helped to raise the trachoma incidence.

De Peyrelongue has described the heavy tribute which French troops and officials have paid to trachoma during past years in Syria and the Lebanon.

## ANNAM.

According to Talbot between 52 and 86 per cent. of the children in the schools are trachomatous as seen by merely everting the eyelids. It may be taken that if the slit-lamp was used a still higher proportion would be found to be infected.

Comés made an examination of children at several places in Annam to the number of 731 with the following results:

| | | Per cent. |
|---|---|---|
| Under the age of 6 months ... | Trachoma stage 1, | 28·3 |
| | ,, ,, 2, | 9·4 |
| From 6 months to 1 year ... | ,, ,, 1, | 32·8 |
| | ,, ,, 2, | 14·1 |
| From 1 to 2 years ... ... | ,, ,, 1, | 37·3 |
| | ,, ,, 2, | 27·7 |
| From 2 to 3 years ... ... | ,, ,, 1, | 37·7 |
| | ,, ,, 2, | 35·3 |
| From 3 to 5 years ... ... | ,, ,, 1, | 34·6 |
| | ,, ,, 2, | 33·7 |

None was found to have reached trachoma stage 3.

Comés also examined 707 parents of children finding with:

| | Per cent. |
|---|---|
| Trachoma stage 1, | 24·3 |
| ,, ,, 2, | 14·9 |
| ,, ,, 3, | 9·9 |
| ,, ,, 4, | 8·9 |

Comés examined the children in boys' and girls' schools to the number of 532 with the following results:

| | Per cent. |
|---|---|
| Trachoma stage 1, | 49·4 |
| ,, ,, 2, | 13·7 |
| ,, ,, 3, | 2·1 |
| ,, ,, 4, | ·9 |

Reports made by Talbot and by Comés do not differ considerably. The incidence of trachoma in Annam, if not universal, is very high.

Motais made an important communication on the subject of the trachomatous infection of European children in Cochin-China. He emphasised the danger of allowing European children to be tended by oriental servants who either are, or may be trachomatous. Whenever possible the servants should be examined medically before they are allowed to come into contact with these children. In trachomatous countries all servants who come in contact with the children of the house should have instilled into their eyes daily some antiseptic drops, and the children also.

### THE ANTILLES.

This group of islands consists of Martinique, Guadeloupe, Saint-Pierre and Miquelon. No trachoma has ever been discovered in the islands.

### NEW HEBRIDES AND NEW CALEDONIA.

Morax and Petit state that trachoma seems to be met with only exceptionally in New Caledonia and the New Hebrides. However, there is a considerable amount of traffic between these islands and Fiji, where trachoma is known to be rife, and it is unlikely that they have escaped.

### TONKIN, COCHIN-CHINA, PONDICHERRY.

According to Cazaux there is mass infection with trachoma in Tonkin, while conditions appear to be a little better in Cochin-China according to Motais. The latter has seen many French citizens from Pondicherry suffering from the disease.

### GERMANY.

The part of Germany most affected by trachoma is Eastern Prussia, but several foci exist in the Rhineland of Westphalia. The sources of contagion are not in the autochthonous population but in miners coming from the East, or from agricultural labourers from Poland.

In 1930 the number of cases treated in East Prussia was 1,231, of which 25 per cent. were fresh cases.

From 1877 to 1883 there were according to Kuhnt 16 per cent. of the new patients attending the ophthalmic clinic at Koenigsberg who were trachomatous, but now Birch-Hirschfeld says they are about 4 per cent. The reason for this is stated to be because hospitals have increased and because immigrant labourers from Lithuania, Poland and Russia have diminished.

Birch-Hirschfeld has often had occasion to observe the contamination of young people by the elders of their families who are infected with trachoma, Tr. III. This is an important observation, and is worthy of note by every ophthalmologist who has to do with trachoma, whether in isolated cases or in a trachomatous country.

### AUSTRIA.

The territory of Burgenland in Austria was formerly fairly heavily infected with trachoma, between 15 and 20 per cent. of the school children being affected; however, the proportions have

been reduced by a half or a third. In the South of Styria there is still a heavy incidence.

## ANCIENT GREECE.

It is supposed that Dioscorides, a Greek from Cilicia, was the first to make use of the term trachoma. He was flourishing in the first century of our era, and was mainly a pharmacologist, so it is probable that he took the word from the works of older writers which have not come down to us.

The frequency of trachoma among the ancient Greeks is unknown to us. However, Herodotus relates that among the 300 Spartan soldiers of Leonidas at Thermopylae there were two who had to be sent to the rear owing to severe ocular trouble.

All kinds of treatment were used including grattage with powdered pumice stone, copper sulphate, et cetera. For trichiasis numerous procedures were adopted. Sometimes the offending lash was gummed to those in proper position, lashes were epilated, the operations of anabrochism, anarraphe, katarraphe and many others were used, for a description of which the paper by Gabrielides must be consulted (*Rev. Internat. du Trachome*, 1932, p. 95).

## MODERN GREECE.

The incidence of trachoma in modern Greece has been greatly increased by the influx of one and a half million refugees from Asia Minor in 1922, all of whom bore the stigmata of trachoma. Among these latter, superimposed bacterial infections were common. Even before 1922 in some parts the known incidence of the disease reached 70 per cent. A considerable amount of medical relief has been provided.

The most affected regions are the Island of Crete, the Islands of the Aegean Sea, the Ionian Islands, the Peloponnesus and Continental Greece.

## GUATEMALA.

Pacheto refers to the small infestation with trachoma in a communication (*Arch. Ophthal. Hisp.-Amer.*, 1919).

## HOLLAND.

It has been suggested that trachoma was introduced into Holland during the eighteenth century by Jews coming from the East. These settled mostly at Amsterdam which has always been the chief focus of the disease. In the poorer Jewish schools the incidence in some cases was as high as 75 per cent.

Between 1914 and 1917 a Commission of Enquiry found that in the schools 0·8 per cent. of the Christians and 8·8 per cent. of the Jews were affected. Among other interesting facts it was found that the great majority of the children complained of no ocular symptoms and had never had any treatment.

In his report Jitta goes on to say that contamination usually occurs in the family and before the age of six years; also that after six years, the age at which children begin to go to school, the trachoma incidence does not increase, showing that the provision of special schools is not necessary.

The system of prophylaxis carried out in the city of Amsterdam has been as follows:

(1) A regular control of all the pupils in all the schools by a trachomatologist with the object of finding and treating all new cases.

(2) Registration of all trachoma patients giving name, address, age, race, etc.

(3) Early treatment before the appearance of such corneal complications as keratitis, ulcers and severe pannus.

(4) Continued observation during treatment.

(5) Continuation of treatment until a complete cure has been effected. This may last for two or three years.

(6) Attendance at school is forbidden to those who do not carry out the treatment prescribed.

(7) The provision of hospital facilities for out-patients in any particularly affected quarter of the city.

Besides these specific measures an attempt has been made to raise the standard of life and to improve individual hygiene; also of great importance has been the improvement in the sanitation of the houses, since it is within the first six years of life that infection is principally contracted.

The application of this plan has produced in Amsterdam the happiest results. There are now no fresh cases among children and the special control of the schools has been abolished. Altogether in Holland only five or six new cases are detected yearly. However, there is still some trachoma at Limburg near the German and Belgian frontier. This latter information was given to me by Wibaut (1937).

### DUTCH EAST INDIES.

With a teeming population of over fifty millions Java, Sumatra and the other Dutch possessions in the East Indies are heavily infected with trachoma. It is important to note that besides Malay and Chinese population the Dutch settlers, men, women and children are stated to be infected to the amount of between

5 and 6 per cent.; this is no doubt due to the frequency of unions between Europeans and native women.

### DUTCH GUIANA.

According to Wibaut the incidence of trachoma varies in Dutch Guiana from 2 to 4·9 per cent.

### HUNGARY.

It is a pride of the Hungarian nation that their country was the first to organise a methodical campaign against trachoma. This was instituted by Feuer in 1883, and in 1886 a law was passed to provide for the gratutious treatment of indigent sufferers. After the death of the illustrious Feuer, de Grosz, University Professor of Ophthalmology, was charged with the administration of the campaign. Trachoma was made a notifiable disease, and ophthalmological examinations of school children and factory workers became general.

The disease is found in every part of Hungary, and in certain parts not less than 10 per cent. of the children in the schools have been found to be infected.

During the Great War trachomatous conscripts for the army were dismissed; but with the need for greater man-power they were enrolled and subjected to treatment such as would render them non-infective in their regiments. As far as possible they were allotted to special regiments. The trachomatous battalions were well provided with ophthalmologists, and it has been shown that 79 per cent. were quickly rendered non-contagious, 20 per cent. required a longer period of treatment, and only 1 per cent. were found to be useless for active service.

### ICELAND AND GREENLAND.

According to Wibaut there is perhaps 0·1 per cent. of trachoma among the resident population of these territories.

### IRAQ.

In a private letter written in 1921, Dr. Gordon Spencer informed me that the incidence of trachoma among the inhabitants of Baghdad was usually given as 80 per cent., but in his opinion this was too low an estimate. There are a large number of Jews in Baghdad who are singularly free from the disease. Acute contagious ophthalmia is very prevalent; this begins rather later in the year than it does in Egypt. The results of hospital treatment are very bad, since the sufferers do not usually present

themselves until the cornea has become badly ulcerated. Baghdad is infested with so-called oculists who treat their cases with eggs, onions or Egyptian sugar.

## ITALY.

The incidence of trachoma in Italy varies greatly in different parts. In Florence in 1907 out of 15,000 school children examined 3·19 per cent. were found to be definitely infected. However, as the result of intensive precautions this was reduced to 0·27 per cent.

At Bari it has been observed that trachoma is much more prevalent among school children who inhabit the older quarters of the town than among those who live in the newer and more sanitary parts. At the free ophthalmic dispensary in 1925 44 per cent. of the patients were trachomatous, while in 1929 this percentage had fallen to 27.

At Sassari 21 per cent. of the school children showed gross infection with trachoma in 1920, but ten years later only 10 per cent. exhibited the same condition. In the province of which Sassari is the capital the school incidence of trachoma varies from 17 per cent. to nothing.

The factors which favour the diffusion of trachoma in this province are: a defective water supply, the general poverty, overcrowding in insanitary houses, and the ignorance of the population as to the danger of contagion.

The island of Sardinia, and especially its southern part, has always had a high incidence of trachoma. The figures given by Mura for the examination of army conscripts for the years from 1889 to 1908 varied for different districts from 60 to 14 per cent. of those examined. An enquiry conducted by the sanitary officers in 1926 shows that while there have been variations from these figures there is still a considerable number of infected persons. Superimposed bacterial infections are very common, such as those caused by the bacillus of Koch-Weeks, the diplobacillus of Morax-Axenfeld, the gonococcus and the staphylococcus.

The factors which cause the diffusion of trachoma are various. They are insanitary overcrowded dwellings, inferior nourishment and lack of a plentiful supply of water. There is also to be added the high incidence of malaria and tuberculosis.

According to Maggiore recruits for the army were infected with trachoma to the number of 5·6 per cent. in Sardinia and 3·7 per cent. in Apulia; this was the result of medical examinations in 1926.

According to Maggiore 13·8 per cent. of the children in the schools of the province of Apulia and 96 per cent. of the dispensary patients were found to be trachomatous between the years

1926 and 1928; while at Bari, the nearest large town, 12 per cent. of the school children and 30 per cent. of the dispensary patients were trachomatous. However, conditions are very much better in the north of Italy.

There is a considerable difference in the percentages in the various provinces, partly depending on the clinical opinion of the examining surgeon.

### CYRAENAICA.

It is usually believed that there is mass infection among all the races which inhabit the Southern Mediterranean coast, and Cyraenaica was so reported of by Paparcone in 1906. This oculist found that every patient who came to a travelling eye hospital at Tripoli was trachomatous; also that in the schools 85 per cent. of the pupils were definitely infected.

### JAPAN.

At the XIIIth International Congress of Ophthalmology at Amsterdam, Miyashita gave an account of the geographical distribution of trachoma in Japan. His statistics are among the most complete in the world, for it is possible to examine legally millions of people. Some of the figures given are as follows:

| Province. | Per cent. trachomatous. |
|---|---|
| High Japan ... ... ... ... | 9·91. |
| Formosa (schools) ... ... ... | 27·9 to 38·51. |
| Korea (schools) ... ... ... | 6·04. |
| High Japan ... ... ... ... | 27·84. |
| Sakhalin ... ... ... ... | 25·5. |
| Formosa ... ... ... ... | 40. |
| Korea ... ... ... ... | 15·6. |
| North China ... ... ... ... | 41·4. |
| South China ... ... ... ... | 33·4. |

In 1928 out of more than half a million recruits about 12 per cent. were found to be trachomatous, but the disease was mainly of a light type.

In 1919 the Japanese legislature passed an important law to enforce social measures taken to combat the disease. Every medical practitioner who diagnoses a case of trachoma must give proper instructions to the patient and the relatives as to disinfection and preventive measures, which have to be carried out, and the patient must undergo treatment; in the case of destitute persons the cost of treatment is provided. The employment of

domestic servants who are infected with trachoma is forbidden. In schools, workshops, hotels, lodging houses and hairdressers' shops the manager is compelled to take all necessary precautions to prevent the spread of contagion.

All men in Japan are twice submitted to eye examination, first when they have a preliminary military training at the age of 19 years, and again at the recruiting age of 20, the first is by the local physician and the second by the Officers of the Army Medical Corps.

Men and women teachers and school children throughout the country are examined once a year for trachoma by the school medical officer or by an ophthalmologist. Among the remaining population a general eye examination is carried out only in districts with a high trachoma index.

Japanese emigrants are examined twice before being allowed to embark for destinations abroad. Immigrants are also examined for active trachoma on arrival in Japan. Miyashita assures us that the various regulations for the suppression of trachoma have been carried out strictly since the passing of the law in 1919. Approximately 10 million persons are examined for trachoma annually in Japan, for the expense of which the Central and Provincial Governments disburse 760,000 yen (£38,660) annually, or rather less than one penny per examination.

There is no generalised treatment in the schools, although this is the case at a few of them; this is recognised to be desirable.

On the whole the adoption of the law for the prevention of trachoma has led to appreciable results in the campaign against this disease. A decline in the trachoma index has been observed in all classes of the population and among all professions. Experience has shown that the measures adopted have been satisfactory. Miyashita has been impressed by the importance of the early incidence of trachoma among infants and the desirability of inaugurating some form of treatment in the family, as this is the chief place where primary infection occurs.

Oguchi and Majima examined the inhabitants of a small island not far from the town of Nagoya, called Shino-jima. Here live a group of 2,500 persons who get their living by fishing. More than 80 per cent. of these people are trachomatous, the women being more severely affected than the men. There are said to be very few complications by entropion or trichiasis.

## LUXEMBOURG.

Luxembourg is an independent grand duchy with an area of about 1,000 square miles and surrounded by Belgium, France and Germany. While the indigenous population is practically free

from trachoma there is a large influx of labourers amounting to about 20,000 Italians, Poles, Czecho-Slovaks, Yugo-Slavs, etc., most of whom are trachomatous. These temporary immigrants are not accompanied by their families. There are about 10,000 other foreigners, Germans, Belgians and French among whom trachoma is rare.

### MEXICO.

At the Pan-American Medical Congress at Mexico City in 1896 it was stated that trachoma did not exist in the State. However, in 1906 it was shown that the disease did exist and that it had been brought by immigrants from Asia Minor. Since then there has been a large immigration of Chinese and Japanese of whom between 80 and 90 per cent. are infected. The ports have now been closed to Asiatic immigration.

### NEPAL.

Nepal is an autonomous State, about the size of England, situated in the Himalayas, between British India and Tibet. From this country are drawn volunteers to serve in their own Gurkha regiments under British officers. Recruits showed an entire freedom from trachoma. After one year's service it was found that 5 per cent. were infected. Soldiers who have served for from five to ten years show an incidence of 8·7 per cent. It was found by Captain Shannon of the Indian Medical Service that the sons of serving or of pensioned soldiers, so called " line boys," who have been born in, and have lived in their unit lines since childhood, and then enlist in their traditional regiment, are infected to the extent of 23·5 per cent.

It seems therefore that Nepal is, as a country, free from trachoma, but that its nationals acquire the disease from contact with the trachomatous Indians.

### NORWAY, DENMARK, SWEDEN.

There is no appreciable amount of trachoma in Norway or Denmark. In some parts of Southern Sweden there are areas where trachoma is endemic. In other parts there is still an appreciable amount of the disease.

### OCEANEA POLYNESIA.

Trachoma is widespread in the numerous islands of the Pacific Ocean.

## AMERICAN SAMOA.

According to Harbert the incidence of trachoma in Samoa is about 44 per cent. The Samoan is a stoic Polynesian and accepts illness very casually. Little attention is paid to the prevalent eye diseases in their mild form, and often symptoms are denied when the eyes show obvious active infection. It is only when complications have set in that treatment is considered. For these acute flare-ups the treatment is usually heroic; infusions of various herbs or fruit-juices may be tried first, or the method of scarification may be resorted to immediately. The latter consists in abrading the cornea with a variety of sword-grass. The effect of this treatment is to promote an intense hyperaemia, which, of course, favours healing, but unfortunately the cornea is too often opaque when it occurs. The number of large corneal scars is in a large measure due to this drastic treatment. Apparently the contagious qualities of the disease are not realised, for no precautions are taken.

Epithelial scrapings taken from active trachoma cases were found by Bengtson to show Halberstaedter-Prowaczek Körperchen.

In 1923 Hunt reported 454 cases of blindness, of which 86 were bilateral. The estimated population at this time was 8,184. This would represent 1,050 cases of bilateral blindness per 100,000 of the population. Palestine has usually been credited as being the country with the highest incidence of blindness, which is 843 per 100,000.

A similar survey in 1933 by Stephens gave an estimate of 680 cases of bilateral blindness per 100,000, so there has been considerable improvement in ten years.

## PERSIA.

Persia is a vast table land, girdled by lofty mountains, with fertile valleys in between, and in the centre much salt desert. It has an area more than three times the size of France.

At the capital, Teheran, about 10 to 15 per cent. of the inhabitants suffer from trachoma, while in the south-west of Persia the percentage rises to 40 or 45.

## PERU.

There is a certain amount of trachoma, natives and foreigners being equally affected. However, Palestinian immigrants are all trachomatous.

## POLAND.

Poland is heavily stricken with trachoma. At the Wilno hospitals 37 per cent. suffer from the disease, however, this high incidence is greater than in some of the other departments of the country. According to Zachert Poland is less contaminated than the surrounding countries such as Lithuania and Russia. Owing to the efforts of Zachert and others a great impetus has been given to the eradication and treatment of trachoma; this has been described at length by Sexe (*Rev. Internat. du Trachome*, 1935, p. 217).

## PORTUGAL.

In the three principal cities of Portugal, Lisbon, Coimbra and Porto about 5 to 6 per cent. of ophthalmic consultations are for trachoma.

According to Calves 35 per cent. of the children in " asiles " and 9 per cent. of those in the schools are trachomatous; and this is a conservative estimate.

## MADEIRA.

Madeira is of volcanic formation and while agreeable in the winter is hot in summer. There is very little dust but flies abound in hot weather, especially in one of the villages which is inhabited by fishermen, where trachoma is endemic. Here there is gross over-crowding in the houses, a complete ignorance of ordinary hygiene, and worst of all a shortage of water.

In other parts of Madeira there is practically no evidence of the disease, although the fisher-wives visit neighbouring villages in order to exchange their fish for vegetables.

There is a tradition that trachoma was imported many years ago from Brazil by a single family which came from that country.

## SPAIN.

Like the whole of the Mediterranean litoral the Spanish coast-towns show a high trachoma incidence. The southern provinces of Murcia, Almeria, Valencia and Castellon are the most affected, " ou 85 ou peut-etre le 90 per cent. de la Population est trachomateux " (Soria, XIII Concilium Ophth., Vol. III, p. 113).

Previous to the disastrous civil war a national anti-trachomatous service was established under Marin Amat, the work of which was described in the Report of the XIV Concilium Ophthalmologicum (Vol. III, p. 89).

There is no trachoma among the well-to-do classes.

## SWITZERLAND.

A study of all trachoma cases treated at Bâle Clinic for the years 1923 to 1928 showed that out of 51 cases seen, 14 originated in Switzerland, the rest being introduced from Eastern Europe and the neighbouring German, French and Italian provinces.

## TURKEY.

The Turkish Republic occupies an area in Asia Minor about the size of France. Mass infection is the rule except among the richer classes, though there is some variation of incidence in different parts. The country abuts on Georgia, Armenia, Syria and Mesopotamia, where mass infection again obtains.

Trachoma is seen in all races, Turks, Greeks, Jews and Armenians, and at every age from three months to 70 years, as well as in every altitude and climate even among the most robust. The main cause is the lack of elementary hygiene, and in some places the deficiency of water.

According to a Government Report a considerable effort is being made to alleviate the disease. This has been prepared by the Under Secretary of State and Dr. Ayberk for the XV Concilium Ophthalmologicum. More than one hundred and fifty thousand persons were examined by oculists, and it was found that in the towns about 62 per cent., and in the villages 76 per cent. of the inhabitants were trachomatous. Superimposed bacterial infections affect about 40 per cent. of the people; these are due to the Koch-Weeks bacillus in 54 per cent., to the pneumococcus in 11 per cent., to the diplobacillus of Morax-Axenfeld in 17 per cent., to the staphylococcus or streptococcus in 5·4 per cent., and to the gonococcus in 2·3 per cent.

As found by MacCallan in Egypt spontaneous cure occurs in about 10 per cent. of those affected; these often have no disability as the result of the disease.

Babies become infected during the first three or four months of life. According to the authors chaulmoogra oil has no therapeutic value in trachoma.

## URUGUAY.

Barriére, of Montevideo, the capital of Uruguay, finds it difficult to give any exact account of the amount of trachoma in the republic. In the country districts there are no resident oculists, but those of his colleagues who have made professional journeys into the interior are agreed that trachoma is rife; they believe that the farms and estancias are more affected than the towns.

Since 1915 trachomatous immigrants are refused admission to Uruguay, but Barriére thinks that the greater danger comes from the country itself, for 61 per cent. of the trachomatous persons are Uruguayans, but only 19 per cent. of the Spaniards, and 9 per cent. of the Italians. There is only one hospital where treatment for trachoma and its sequelae can be obtained, and that is at Montevideo.

## VENEZUELA.

While trachoma is found in all parts of the Venezuelan coast where immigrants such as Arabs, Chinese and Russians have settled, it is also present to some extent among the people of the interior, who have little communication with the coastal towns. However, the contagion was undoubtedly brought in by immigrants.

## YUGO-SLAVIA.

Yugo-Slavia is about twice the size of England and Wales, and is composed of the following territories: Croatia, Herzegovina, Montenegro, Dalmatia, Serbia, Bosnia and Slovenia.

An interesting research into the incidence of trachoma has been made by Kostitch (*Rev. Internat. du Trachome,* 1925, p. 80). The war has been an important cause of the extension of trachoma in Serbia. The Serbian Army after its retreat through Albania spent some time in the Island of Corfou, a highly trachomatous place; from there it proceeded to the Macedonian front which also is highly infected. A large part of the population, including old men, children and soldier-prisoners, was interned in Austrian-Hungarian and Bulgarian camps, which were hotbeds of infection. Those who were fortunate enough to survive the internment brought back a mass infection with trachoma.

At the town Podrigne it was established in 1925 that 10 per cent. of the day-pupils and 72 per cent. of the boarders in the schools were infected.

# WITHDRAWAL OF INTER-RETINAL FLUID IN DETACHMENT OPERATION BY SIMPLE SUCTION APPARATUS

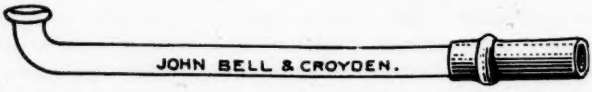
BY

C. J. BLUMENTHAL

LONDON

RECENTLY several surgeons at the Moorfields Eye Hospital have been using Weve's operative technique (with minor modifications) for detachment of the retina. In short, this consists of accurate localisation of the hole or holes and the edge of a dialysis by means of a narrow beam of light; and localised surface diathermy by the unipolar method, followed by fine punctures, also unipolar, in the area of surface diathermy. Weve stresses the importance of seeing that the retina surrounding the hole lies in perfect apposition with the choroid at the end of operation. In many, if not in most cases, it is often impossible to remove all the inter-retinal fluid, either by massage or by further punctures, both undesirable practices when carried to excess.

In order to facilitate the removal of fluid, I have tried using a simple suction apparatus which consists of a glass tube with a suction cup at one end, set at the requisite angle, the other end




carrying a length of soft rubber tubing. The whole is boiled and set out with the rest of the instruments. A small plug of loose cotton wool may be packed into the distal end of the glass tube, in order to prevent the possibility of a flow of organisms, either air or fluid, borne towards the operation area. This latter is, however, no real danger. Suction is performed by the mouth of the operator, through a thick mask if desired. When the pressure inside the soft tubing is sufficiently reduced its walls collapse, a simple safeguard against obtaining too high a negative pressure.

The element of danger is negligible. Provided the punctures are sufficiently fine (and two or three will suffice), there is no risk whatever of withdrawing vitreous, even when this is fluid. Haemorrhage, which suggests itself at first thought, does not occur.

Frequently I have been surprised at the amount of extra fluid removed after the initial rush following the first punctures. It seems reasonable to suppose that it is better to ensure its removal

at operation, rather than rely on spontaneous leakage (if this ever occurs) or absorption in the few days immediately following operation.

A view of the fundus on the day after operation bears out this supposition in most cases, and in some it would be difficult to tell, except for the area of coagulation, that there had been a detachment present at all, owing to the entire absence of folds or "ripples" in the retina.

Another possible result of leaving residual fluid behind, even when the coagulated area is flat, is the "floating up" of this area of retina by some unavoidable change of position of the patient's head in the 48 hours immediately after operation.

My thanks are due to those honorary surgeons whose patients I have treated by this technique and to Dr. Browning for his helpful interest. The instrument was made for me by Messrs. John Bell and Croyden.

## A HYDROSTATIC APPROACH TO THE POSTERIOR CHAMBER FOR DIAGNOSTIC AND THERAPEUTIC PURPOSES

BY

PROFESSOR DR. A. MOTEGI

TAIHOKU, JAPAN

IN my clinic there are three types of patients, whose examination and treatment present considerable difficulty.

1. Patients with poor vision where the anterior segment of the eye is nearly normal, but the fundus invisible.

2. Patients with poor vision, following diseases of the anterior segment, peculiar to the tropics, where the fundus is again invisible. In both types of patients a view of the fundus would be of great value.

3. Panophthalmitis, a relatively common condition in my experience and one for which it is rarely possible to do anything.

To deal with these cases I have devised a technique I described as "Intra-ocular irrigation." Through an incised wound of the eyeball I run 0·9 per cent. salt solution or Ringer's solution at body temperature.

The excess drops out of the wound. In infected cases this may be followed by autoserum. If the vitreous is fluid, the eye tends to collapse as it exudes. The irrigation restores the globular form of the eye and enables observation of the interior to be made

through the incision. If the vitreous is turbid it is easier to see the fundus through the clear saline, which replaces it, than through the hazy medium. This method allows both of the removal of the foreign bodies and the lavage from the posterior chamber of infective material in cases of panophthalmitis with possibility of cure under direct vision.

*Experimental Evidence.*—In order to determine whether a limbal or a scleral section caused the greater trauma and to determine the optimum of the solution and technique, we experimented with rabbits.

We ascertained that while haemorrhage is relatively slight from a penetrating incision of the normal sclerotic, it may be very severe if there are pathological changes in the interior of the eye. We experimented with a diathermy knife, because after incision with a usual knife a haemorrhage occurring during the irrigation rendered observation of the fundus difficult and we ran the risk of detachment and delayed intra-ocular haemorrhage after the operation. Prior to using the diathermy knife, it is advisable to incise the conjunctiva and to resect the ocular muscles to obtain an adequate exposure. Haemorrhage is slight during the use of the electric knife, and if it does occur is easily controlled by coagulation. The main disadvantage, however, is that the wound heals two or three times more slowly than if made with a cutting edge.

We expect perfect healing of a sclero-corneal flap involving 3/5 of the whole corneal edge without keratitis. In rabbits, however, it is advisable to stitch the conjunctival and corneal flaps.

Autogenous injection of blood into the vitreous space may cause changes in the intra-ocular tissues and is not desirable. I prefer to pass round a Graefe's knife through the centre of the cornea and that of the pupil without touching the retina and ciliary body and to suture a corneo-conjunctival flap.

Contrasting with the normal eyeball we experimented with the intra-ocular irrigation in pathological cases. Of course histological changes at the point of incision were observed after intra-ocular irrigation, but without cellular infiltration into the retina and choroid.

I experimented with 0·9 per cent. salt solution or Ringer's solution at 12-38°C., at different pressures between the highest, 10 c.m. of water and the lowest, such as that at which the solution drops through a small cannula.

*Technique.*—I have paid great attention to the cannula, which is introduced into the vitreous space in this operation.

It is 36 mm. long and its inside diameter 1·5 mm. It must be as thin as possible, so that the introduction can be effected through a small incision. It is made of glass to ensure its visibility, the

reflex enabling its position to be determined and the retina avoided during operation. The opening at the narrow end of this cannula is so devised that the stream of the solution just turns at an angle to the wound, when it is introduced into the vitreous space,

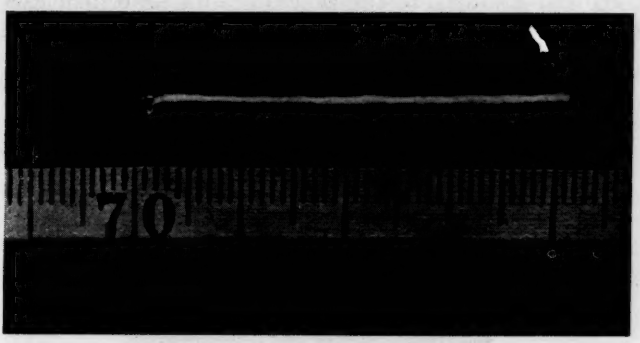


FIG. 1.

Cannula. (The size and direction of the stream of solution is reproduced by a strand of cotton wool).

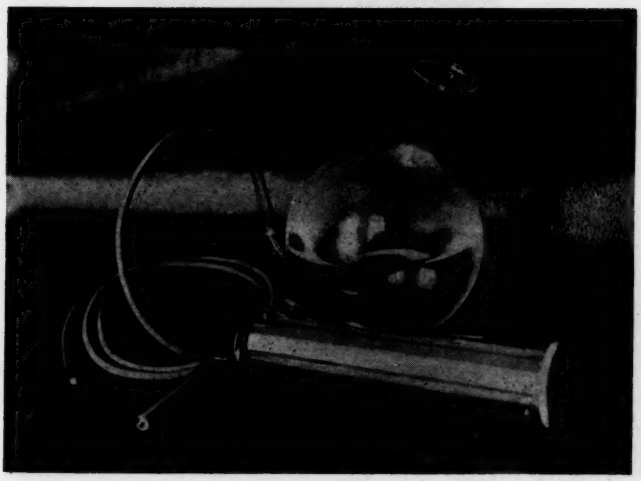


FIG. 2.

Simple equipment for intra-ocular irrigation (an undine with rubber tubing, cannula and electric light).

thus avoiding pressure on the intra-ocular tissues as much as possible.

The intra-ocular irrigation can be performed by attaching the cannula by rubber tubing to an undine, as shown in Fig. 2, but the equipment actually used by me is shown in Figs. 3 and 4.

A cylinder contains an electric bulb in the lower half to warm a bottle containing the solution placed in the upper half. A

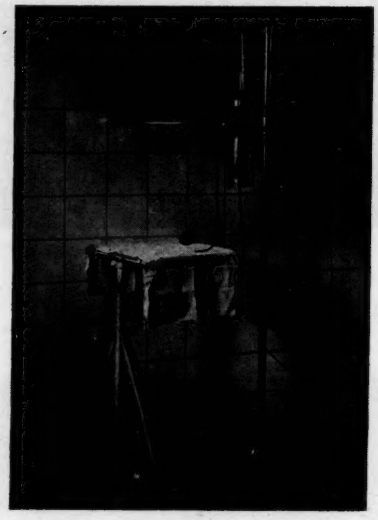


FIG. 3.

Complete set for intra-ocular irrigation. (A) tube; (B) thermometer; (C) cannula; (D) pillar, on which the cylinder can be raised and lowered by a pulley and then fixed by a screw; (E) a pointer to establish the difference in the height of the eye and upper level of the solution.

thermometer and a glass tube with rubber tube and a cannula is inserted into the stopper of the bottle. The cylinder moves vertically supported by a metal upright and fixed by a screw. A pointer is arranged level with the solution horizontally and also level with the eyeball (Fig. 3).

The tube is fixed a little higher (less than 50 mm.) to the pillar with a screw. The pointer is then placed vertically as Fig. 4.

Finally, one introduces the cannula into the eyeball through the incision. A large corneo-conjunctival flap is made usually in an upward direction involving 2/5-3/5 of the whole corneal edge with a large iridectomy as for glaucoma. While the actual irrigation is proceeding one can examine the interior of the eyeball in all directions through the wound with the naked eye and a small but powerful electric light, or remove discharge, pus and foreign

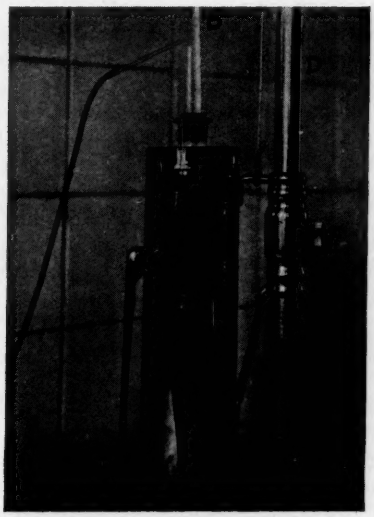


FIG. 4.

Tube (A) with a pillar (D). (B) thermometer; (E) pointer with a joint; (F) screw for the tube.

bodies under direct vision. Also oblique focal illumination is carried out through the wound, which is held open by the pressure in the vitreous space behind it which is filled by the solution. If this opening is not adequate, it is possible to open the wound further by pulling on one edge with iris forceps.

The cannula with rubber tubing and a glass tube, bottle to contain the solution and thermometer must be sterilised in boiling water.

*Review of the Literature.*—There is but little literature available on lavage of the hyaloid space. Sterilisation has been attempted in one case of panophthalmitis with $H_2O_2$. I was interested to

find that T. Tutui recently has cured a panophthalmitis case by lavage of the vitreous space with livanol.

According to Grunér, vision of 0·1-0·5 was retained in 4/20 panophthalmitis cases by the aid of iodoform. The vitreous space was only locally infected in these cases.

Prof. Dr. J. Komoto has introduced lavage of the hyaloid space for haemorrhage. S. Miyashita, K. Nakamura, T. Masuda and others have called "washing of the vitreous" a process of evacuating part of the turbid vitreous and replacing it by normal salt solution.

I could not find in the literature any similar procedure designed for observation of the interior of the vitreous space as a diagnostic measure prior to treatment of poor visual acuity, removal of foreign bodies, or relief of panophthalmitis. I wish to stress that in my technique the solution drops out of the wound under very slight pressure so as not to obstruct the retina and choroid as it flows.

Literature regarding the length of the limbal incision has been noted by Truc (1904), Matsumoto (1905), Cellier (1908), Wahlfore (1911), and in the works of other authors the anterior segment of the eye is cut off instead of performing enucleation.

Sawaljew (1925) transplanted the anterior segment of the eye 15 minutes after the death of an old woman to a patient with total leucoma.

The segment consisted of cornea, iris, ciliary body and sclerotic, and 4 sutures were inserted. The wound healed completely and the cornea remained clear for a time, but phthisis bulbi finally occurred.

In 1928, Batalin reported transplantation of the whole cornea from one patient to another.

The following references are found to scleral incision in the literature. Elschnig has little to say on this subject in the section on operations in the Graefe-Saemisch Handbook (second and third edition, 1922).

Koch (1927) made a window 3-5 mm. wide and 10-15 mm. long to expose the uvea and to remove a subretinal hydatid worm.

Kreuzfeld (1931) scarified the sclerotic in sympathetic ophthalmitis.

As in my method of intra-ocular irrigation, prognosis is rendered worse by the risk of haemorrhage and consequent detachment, I experimented with a diathermy incision. Such incisions have been employed by the following authors:—

Keysser (1931), Jess (1931), Schmerl (1934), Kawahara (1925) and others.

To determine the optimum site of the incision, my assistant, T. Murayama, and myself experimented, as there is little in the above with a direct bearing on my method of intra-ocular irrigation.

## Practical Application of Intra-Ocular Irrigation

1. *Patients with poor visual acuity whose fundi are invisible from changes in the anterior segment of the eye (Group A) or elsewhere (Group B).*

GROUP A.—*Case* 3.—(Female aged 18 years.) Partial Staphyloma of the cornea and corneal degeneration. Perception of light before and after the operation.

Employment of my method with 0·9 per cent. salt solution after excision of the staphyloma, revealed a grayish tough, long standing exudate on the posterior surface of the iris. The wound was too small to allow observation of the complete interior of the eye.

*Case* 5.—(Female aged 14 years.) A shrunken cornea and scleral staphyloma. Requested an artificial eye. No perception of light before or after the operation. Irrigation with salt solution revealed an opaque but normal-sized lens, a fluid vitreous and a grayish globe of exudate 7 mm. in diameter towards the inner side of the posterior chamber. The posterior pole of the vitreous space was normal.

*Case* 9.—(Male aged 34 years.) Cataract and secondary haemorrhagic glaucoma (r). Perception of light before and after the operation. Extraction of the lens and excision of exudate behind it was followed by venous haemorrhage. 0·9 per cent. salt solution was used.

*Case* 10.—(Male aged 24 years.) Adherent leucoma with vision of handmovement at 15 c.m. improved to finger counting at the same distance by the intra-ocular irrigation. The iris was adherent to the whole posterior surface of the cornea, which was torn off with iris forceps from behind. The vitreous was normal but the lens absent and the whole retina covered with a light grayish membranous exudate, which was very distinct on the ciliary body. 0·9 per cent. salt solution employed.

*Case* 11.—(Male aged 37 years.) Partial staphyloma of the cornea and secondary glaucoma (e). Vision, handmovement at 15 c.m. unaffected by the operation. An exfoliated iris adhered to the posterior corneal surface. The lens was normal and the ciliary body at the nasal side covered with a light grayish exudate looking like a veil, 2 or 3 mm. in diameter. As this could not obstruct vision and removal would have damaged the ciliary body, it was left. 0·9 per cent. salt solution employed.

*Case* 12.—(Female aged 19 years.) Partial staphyloma of the cornea with perception of light. The lens was atrophic and the interior of the eye free from exudate. Soon after irrigation this patient saw lighter in the eye. Subsequent to the resection of the staphyloma, the eye was tattooed. In this case I employed Ringer's solution.

*Case* 14.—(Male aged 14 years.) Occlusio pupillae, secondary glaucoma (s). Perception of light. View by intra-ocular irrigation: Lens probably atrophic, being a little smaller than normal. Vitreous clear. Exudate was slightly found on the ciliary body and much more at the nasal part of the posterior pole, inside the eyeball. N.B.—Ringer's solution was used. The patient screwed up the eye, the vitreous and retina were extruded. After stopping the bleeding the operation was terminated. On the 13th day after the operation the cornea was clear and normal in size.

*Case* 15.—(Male aged 49 years.) A cicatricial trachoma with complete pannus, xerosis corneae, secondary glaucoma and total staphyloma corneae (d). Perception of light. View by intra-ocular irrigation: Lens was normal sized. Entirely turbid cornea touching the iris was seen from the rear side. There was nothing else to describe. N.B.—The same as the last case.

GROUP B.—*Case* 1.—(Male aged 22 years.) Adherent leucoma and secondary cataract (s). Finger-counting at 15 c.m. Bleeding was so marked after section of the sclerotic, that it was impossible to observe the interior of the eyeball through the wound or pupil. 0·9 per cent. salt solution was used.

*Case* 7.—(Male aged 47 years.) Synechia posterior iridis, iridodonesis and aphakia (s). Vision: Hand movement at 15 c.m. at first and 0·1 at 0·5 m.

after the intra-ocular irrigation. View by this operation. There was a mobile grayish capular exudate (4×3 mm.) with a fine attachment at the ciliary body. A thin rope-like grayish exudate was found on the ciliary body at the nasal side. Both were cut off with scissors. Deep grayish membranous exudate on the posterior surface of the iris was also seen. 0·9 per cent. salt solution was used.

In patients with poor visual acuity whose fundi are invisible from changes in the anterior segment (group A) intra-ocular irrigation will frequently show membranous grayish exudate on both parts of the ciliary body and the posterior surface of the iris dominated on the former. This may be absent from the retina.

Vision may be slightly improved in such cases by means of removal of this exudate and iridectomy from the posterior iridic surface after incision at the limbus. Case 10 is of this type. Moreover in such cases, the lens is absorbed sooner or later. Glaucoma, where no cause in the anterior segment of the eyeball can be found by present methods (case 9), may be caused by intra-ocular bleeding.

In patients with poor visual acuity, whose fundi are invisible and where no pathological changes in the eyeball can be found by present methods (group B) intra-ocular irrigation will show long standing grayish exudate on the ciliary body, the posterior surface of the iris or the retina.

Vision may be slightly improved by incision of the exudate, which is capsular with a long attachment, or linear. For example improvement occurs from hand movement at 15 c.m. to 0·1 at 0·5 m. in case 7. If, however, the pole of the eyeball on the inside looks grayish from the exudate, recovery of vision is not to be expected.

2. *Application of intra-ocular irrigation in panophthalmitis.*—

*Case* 4.—(Male aged 23 years.) View by intra-ocular irrigation: Anterior portion of the eye full of cyclitic exudate. I removed a purulent mass from the vitreous. Erythrocyte sedimentation test (Linzenmeier's method), I 25 minutes, II 37 minutes, III 57 minutes before intra-ocular irrigation. During the progress of panophthalmitis, a staphyloma sclerae occurred. Intra-ocular irrigation was performed at this point. 0·9 per cent. salt solution was used and this was followed by autoserum. This operation was repeated with a corneo-scleral flap in a further attempt to prevent progress. Ten days after the operation the tension of the eyeball was reduced to T-2 and after 20 days the eyeball began to atrophy.

*Case* 6.—(Female aged 44 years.) View by intra-ocular irrigation: exudate in the anterior chamber removed, but lens not seen. Exudate in the vitreous space is quite fluid behind its centre. At the ciliary body the exudate was tough, but I did not touch it as I feared atrophia bulbi. All exudate except that at the ciliary body was removed.

Erythrocyte sedimentation test,

| I | II | III | |
|---|---|---|---|
| 6, | 11, | 15 | minutes before the operation, |
| 8, | 13, | 21 | minutes on the 3rd day after the operation, |
| 18, | 23, | 29 | minutes on the 10th day after the operation. |

The panophthalmitis was caused by ulcus corneae due to pneumococcus. 0·9 per cent. salt solution followed by autoserum was employed. The eye improved for 18 days after the operation, but finally atrophied.

*Case* 8.—(Female aged 24 years.) View by intra-ocular irrigation: synechia *iridis* anterior, marked. An exudate about 1 mm. thick was noticed on the posterior surface of the iris and the ciliary body. As this was old and not due to panophthalmitis, it was left. No lens was found. A capsule 10 c.m. long and 2·5 c.m. wide reached from the purulent mass based at the perforating corneal ulcer to the vitreous space. This flowed out and was excised.

*Erythrocyte sedimentation test,* I 40 minutes, II 77 minutes, III 145 minutes before the operation. Ulcer was due to the pneumococcus. 0·9 per cent. salt solution and autoserum was used. The case improved from a day following the operation, but after 5 days the patient failed to return.

*Case* 13.—(Female aged 45 years.) View by intra-ocular irrigation: A light yellowish-gray 5×3 mm. purulent mass found at the posterior surface of a corneal ulcer. The centre of the vitreous was fluid and light yellowish. I did not touch the tough exudate, but removed the purulent mass only.

Erythrocyte sedimentation test,

| I | II | III | |
|---|---|---|---|
| 2, | 9, | 11 | minutes before the operation, |
| 13, | 20, | 25 | minutes on the 3rd day after the operation, |
| 11, | 20, | 33 | minutes on the 7th day after the operation. |

The eyeball was immobilised by the infiltration around it. After the operation it appeared to improve. As the patient, however, complained greatly of pain, it was enucleated on the 7th day after the first operation.

This experience shows the possibility of saving cases of panophthalmitis from phthisis bulbi or blindness by intra-ocular irrigation in early stages.

### 3. *Application of this operation for removal of non-magnetic foreign bodies in the eyeball.*

*Case* 2.—(Male aged 22 years.) Vision, 0·1 at 0·5 m. A perforating wound of the cornea 2 mm. long at " 3 o'clock " and another 4 mm. long in the same position in the iris. The radial pattern of the iris was obscured. Some keratic precipitates were present on lower part of the cornea. The pupil was small and irregular and its reaction very much impaired. Grayish exudate was seen in the pupil and behind the lens, which was opaque in the upper nasal quarter. A foreign body in the eyeball was shown by X-ray. It was non-magnetic in nature. View by intra-ocular irrigation: The posterior surface of the iris was covered by grayish membranous exudate. An exudative mass in the vitreous space was removed by forceps. During the intra-ocular irrigation, a small amount of grayish exudate flowed out.

An especially white mass was seen on the membranous exudate in the lower quarter or wider part of the interior of the eyeball. When I pulled on the mass with forceps the patient complained of pain in the eye. After excision of the mass I found a foreign body at the bottom. The operation was performed under local anaesthesia (5 per cent. cocaine drops).

## Conclusion

In order to avoid damaging intra-ocular tissue as much as possible, I used 0·9 per cent. salt solution or Ringer's solution at body temperature. During irrigation I avoid pressure on the retina and choroid by running the stream of the solution at right angles to the wound from the small opening at the end of the cannula introduced into the vitreous space. By doing this we could observe the interior and remove exudate, purulent masses or foreign bodies from the eyeball under direct vision.

I have called the operating method, here described, " Intra-ocular irrigation."

Firstly I had to decide how much the tissues were damaged by this operation and which is the better site for the incision, sclerotic

or limbus. The solutions and technique were tested in experiments with rabbits.

I then had practical experience in 15 human cases.

I will here conclude as a result of my experimental and practical experiences as follows :—

(1) Incision required to be 2/5-3/5 around the cornea with conjunctival flap. Only in unavoidable circumstances is the sclerotic to be incised.

(2) Intra-ocular irrigation does not itself cause pathological changes in the eyeball. But, resistance in the cases which in this operation is indicated, is very weak. Therefore we cannot get such good results practically as in experiments with rabbits. Nevertheless, although the cornea may be a little smaller, phthisis bulbi has never been caused by intra-ocular irrigation itself.

(3) Grayish exudate is found especially in the anterior segment of the eyeball and also slightly on the retina, in cases where there are distinct pathological changes in the anterior segment of the eyeball which disturb vision.

Vision hand movement at 15 c.m. improved to finger-counting at the same distance in case 8.

(4) In a case of cataract with glaucoma, the latter was due to intra-ocular haemorrhage. It was necessary to deal with a good deal of bleeding, during the operation, which may in the worst cases be due to squeezing. On such occasions it is necessary to sew up the wound after controlling the bleeding. If the vitreous is normal, we can observe the inside of the eyeball through the incision, and the operation must not be continued. If nothing gray is observed during the operation we may assume that there are no intra-ocular pathological changes.

(5) Extensive haemorrhage may be caused by scleral incision in cases with poor vision, whose causative changes are not observable in the anterior segment of the eyeball by present methods other than intra-ocular irrigation.

From our experiments with rabbits, we know that this is due to congestion in the eyeball caused by pathological changes. In such cases, corneo-scleral incision with a large conjunctival flap is advisable.

Visual improvement from hand movement at 15 c.m. to 0·1 at 0·5 m. was recorded in a case of slight exudate on the ciliary body and the posterior surface of the iris (case 7).

(6) Panophthalmitis is curable in early stages by intra-ocular irrigation. The case 8 is an example. All symptoms of panophthalmitis including the erythrocyte sedimentation test and except pain improved after intra-ocular irrigation in case 13. Section revealed the pain to be due to subchoroideal haemorrhage.

(7) Intra-ocular irrigation is very useful in the extraction of non-magnetic foreign bodies from the eyeball.

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## ANNOTATION

### Vision in Motoring

In a report on "motor vision in safe driving," recently published by the National Society for the Prevention of Blindness, Dr. Laver points out that many accidents occur through (1) failure of the driver to see or interpret a warning signal in time to avoid danger; (2) failure of the driver to determine the exact location of a vehicle, person, or other object in time to avoid collision; (3) failure of the driver to see objects or persons at night.

To the first category belong such conditions as low acuity of vision, restricted field of vision, scotomata, ocular dominance, or the tendency to use one eye more than the other, and lowered attention, which may result in temporary psychic blindness of one or both eyes. The second category deals with such deficiences as poor distance judgment, or muscle imbalance, causing double images. "The driver might see two pairs of headlights in the distance and assume that one car was attempting to pass another, while, in reality there was but one car." The third category deals with blinding lights. Here different persons vary enormously. The young usually stand glaring lights better than the old. The author hopes that the perfection of polarizing glass may solve the glare problem soon. He thinks that the driver should be apprised of his actual potentiality as a driver. "A driver should go no faster than his visibility allows. If the eyes are defective, they should be made as good as possible. There will be plenty of danger from other causes at best." There is no need for us to emphasize the importance of good vision in motoring, including both macular acuity and absence of field restriction. But the best vision in the world will be at a disadvantage in times of over tiredness or stress from any other cause. Accidents on the highway were not unknown before the advent of the motor car and it is obvious that a certain number of accidents are unavoidable. At the same time the numbers in this country are positively appalling and, without being enthusiastic over any further extension of beaurocratic control, we think that the question of the driver's vision has not perhaps received the amount of attention that it deserves. It would not raise so much disquiet in the minds of thinking persons if it were only the driver himself who got maimed or killed. A man may legitimately take some risks if he has only himself to think about. It would be absurd to rule that no one should go mountaineering because accidents have happened in the Alps. Nor should the fact that people have been drowned while boating put a stop to that exercise.

But the driver is not the only person to be considered; there are his passengers, the occupants of the other vehicle and the pedestrians.

When all is considered the visual acuity of the driver is only one of many points in motoring, but it is a very important one. We certainly think that a driver who has caused a death on the roads by carelessness should be debarred from ever having a licence to drive again. Of course if he kills himself there will be no need for any such restrictions, but the unfortunate thing is that so often it is the opposite party who suffers.

## OXFORD OPHTHALMOLOGICAL CONGRESS

THE twenty-seventh annual meeting of the Congress was held at Keble College on July 7, 8 and 9. The Master, Mr. C. G. Russ Wood presided.

PROF. HUGH CAIRNS (Oxford) opened from the neurosurgical standpoint a discussion on the aetiology, diagnosis and treatment of ocular palsies. He said that the lesions causing ocular palsies are mostly expanding lesions within the orbit and cranium, the clinical picture depending to a remarkable extent upon the speed with which compression or stretching is produced. He referred to the work of Russell Brain on exophthalmic ophthalmoplegia, a progressive condition often following thyroidectomy but also developing spontaneously without thyroid changes. Prof. Cairns concluded by saying there was no short cut to the mapping of this fascinating field, which could be further explored by the use of radiography, ventriculography and arteriography, and in appropriate cases by surgical exploration.

DR. BERNARD CHAVASSE (Liverpool) spoke of the clinical sequelae of ocular palsies. He described the causes and results of over action of muscles and the effects of over action on the muscle itself and on the fasciae of the orbit. Dr. Chavasse discussed the aetiology of congenital torticollis and the diagnosis and treatment of congenital palsies.

MR. F. A. WILLIAMSON-NOBLE (London) gave an address on contact glasses from the clinical standpoint with a survey of results obtained. The indications for contact glasses were optical, occupational and cosmetic. Optical indications included (*a*) high myopia, (*b*) conical cornea, (*c*) after-effects of mustard-gas burns, (*d*) hypermetropia and astigmatism, (*e*) macular disease, (*f*) faceted cornea. A questionnaire addressed to a large number of patients showed that 50 per cent. of myopes could wear contact glasses for six

hours or more. Conical cornea patients tolerated them better still and excellent results were obtained in the mustard-gas and pemphigus cases.

DR. I. A. VAN HEUVEN (Utrecht) read a paper on papilloedema. He said that hydrostatic experiments seem to confirm his views that papilloedema developed when intracranial exceeded intra-ocular pressure. As to the genesis of papilloedema mechanical factors played an important rôle, but they could not account for all the phenomena. The colloid chemical conditions of the optic nerve and surrounding tissues also influenced the development of papilloedema.

PROF. HUGH CAIRNS (Oxford) produced experimental evidence that concentration of $CO_2$ in the cerebral blood increased intracranial pressure.

Cataract.—The Doyne Memorial Lecture was delivered by DR. A. VON SZILY, Emeritus Director of the University Eye Clinic of Münster. Discussing histology the lecturer showed a number of slides demonstrating the displacement of the nuclear corona and other features of normal and abnormal development of the lens. He traced histologically the development of punctate, lamellar and nuclear cataract, and contrasted them with the conditions observed during the formation of hard and soft senile cataracts, of Morgagnian degeneration of the lens and of complicated cataracts.

Intracranial Blood Pressure and Intra-ocular Tension.—PROF. HANS LAUBER (Warsaw) delivered an address on the relationship between intracranial and retinal blood pressure and intra-ocular tension. He described the influence of general low blood pressure in accelerating the progress of optic atrophy. Dr. Lauber noted that the treatment of optic atrophy must aim at raising the general blood pressure and lowering intra-ocular tension. He concluded that hydrodynamic disturbances were among the most important factors in the formation of tabetic and some other varieties of optic atrophy.

Anaesthesia in Ophthalmic Surgery.—A discussion was opened by Dr. H. M. TRAQUAIR (Edinburgh). He described how total anaesthesia had now been achieved by injection round the lids over a wide area, by applying cocaine to the eyes and by subconjunctival injections above and below the cornea.

DR. MARGARET GALBRAITH (Birmingham) gave statistics of post-operative vomiting with different methods of anaesthesia.

MR. LINDSAY REA (London) detailed his technique of orbital injections with a specially made curved needle.

Some other Communications.—MR. HARRISON BUTLER, speaking on capsular glaucoma, showed drawings to illustrate detachment of the zonular lamella from the lens in traumatic and pathological

conditions. He appealed to members of the congress to make slit-lamp observations so that the true frequency of this condition might be established.

MR. FREDERICK RIDLEY (London) described an "active" substance in the tears. He suggested that in glaucoma there might be a lack of some substance antagonistic to histamine-like bodies. His own work showed in normal tears a substance similar to histamine; it was not destroyed by boiling or by blood or serum. It was not acetylcholine. It produced the wheal and flare reaction in the skin and caused a rise in intra-ocular pressure through vascular dilatation.

DR. IDA CZUKRASZ (Debreçen) described Hungarian plastic methods particularly those employed by Prof. Blaskovics and Prof. Kreiker, showing photographs of the excellent cosmetic results obtained in replacing large areas of diseased skin in the region of the lids.

# ABSTRACTS

## I.—CONJUNCTIVA

(1) **Wilson, R. P. (Cairo).—The pathology of trachoma.** Fifteenth Concilium Ophthalmologicum, International Organisation against Trachoma.

(1) Several cases of accidental infection in doctors have been observed by **Wilson.** In all of them the disease began after a few days with moderately acute symptoms such as redness and oedema of the conjunctiva, oedema of the limbus and slight discharge. In other persons, however, the disease begins imperceptibly, and is usually in Egypt obscured by chronic mixed infections.

### *Incipient Trachoma*

In the initial stage there appear the phenomena of a subacute inflammation. In the lamina propria of the conjunctiva the superficial capillaries become dilated, the endothelial cells lining the smallest vessels enlarge and show signs of proliferation, there is an increase in the number of lymphocytes normally occurring in this situation, especially in the neighbourhood of the small vessels, and the number of histiocytes is greatly increased; the histiocyte has many other names—mononuclear cell, endothelial leucocyte, endothelioid cell, monocyte, polyblast, etc. A few plasma cells are present right from the beginning, but polymorphs are inconspicuous except in the epithelium itself, where they are to be found in small

numbers. Their presence is due to the pyogenic organisms growing in the epithelium at the same time, and it is common to find little pockets of polymorphs in the crypts of the epithelium.

The epithelial layer shows increased activity of the mucin-forming cells, cell division is active in the deeper layers, and the number of layers becomes increased, the superficial cells becoming flattened.

Papillary hypertrophy occurs: this is due to the traction effect of fine fibrous bands which anchor the tarsal epithelium to the lamina propria (Goldzieher). It increases to such an extent that any follicles which form in the tarsal conjunctiva are entirely obscured, and are never recognizable.

In what Wilson calls the prototrachomatous stage the plasma cells increase in number especially in the papillae; the actual proportion of the different kinds of cell being—lymphocytes 30 to 35 per cent., plasma cells 20 to 25 per cent., histiocytes 45 to 50 per cent. and a few macrophages.

The first signs of trachoma follicles are small aggregations of the above mentioned cells at the upper edge of the tarsus and in the retrotarsal folds; they tend to be flattened on the tarsus and spherical elsewhere. The follicles become scattered over the whole tarsal conjunctiva; thereby differentiating trachoma from other conditions of folliculosis, whether of the conjunctiva or of other mucous membranes.

### *The Trachoma Follicle*

The trachoma follicle is the response to a definite infective process. It is best observed on the tarsus, since follicles are not normally found here. It has neither an endothelial lining, nor a capsule. The author has no doubt that the centre of the follicle is composed of histiocytes which have become localized as a reaction to the treatment; there are also here a few Leber cells or inflammatory macrophages such as occur in ordinary lymph nodes. In the older follicles the central cells stain poorly since they are undergoing autolysis. Nearer to the periphery there are a few cells with dark-staining nuclei, which are probably lymphoblasts; plasma cells are rarely seen. Here there is active cell-proliferation.

The opinion of Pulvertaft and MacCallan that the "bleb-like excrescences" of Tr. II*a* are due to mechanical blocking of the ducts of Meibomian glands is in Wilson's opinion untenable. These are best developed just above the upper edge of the tarsus and in the retro-tarsal folds where no Meibomian glands exist. Cysts do occur in the late stages of trachoma due to a blockage, but never to the extent of producing an actual protuberance of the conjunctiva.

The follicles may disappear entirely in the general resolution of the inflammatory process, but this is by no means common. The larger superficial follicles, especially at the upper border of the tarsus

rupture spontaneously or with the slightest trauma. The deeper ones, surrounded by a dense infiltration of cells, especially in cases of marked papillary hypertrophy, never rupture but gradually disappear in the process of cicatrization. Cicatrization never commences within the follicle but the follicle is invaded from without.

### *The Follicles of Follicular Conjunctivitis*

In follicular conjunctivitis the Halberstaedter-Prowaczek Körperchen, so constantly to be found in trachoma, are never present. There is very little papillary hypertrophy, since there is no diffuse infiltration of the subepithelial layer as in trachoma. The follicles become absorbed without the cicatrization which is characteristic of trachoma.

### *Trachoma Stage IIb*

Follicles are invariably present in trachoma but they may be invisible clinically owing to the dense infiltration of the sub-epithelial layer. This raises the epithelium in huge papillae, between which there are deep epithelial crypts, the pseudo-glands of Henle or Berlin-Iwanoff. Within the crypts there may be collections of cells indicating a secondary infection; these may become blocked to form pseudo-cysts filled with epithelial débris. They may undergo calcareous degeneration giving rise to the concretions (P.T.D.) so frequently found in the cicatricial stage (Tr. III).

The cells which constitute the infiltration are almost entirely plasma cells; many of these degenerate and form an eosinophilic globule, with the nucleus pressed to the periphery (Russell bodies).

The tarsus may be only slightly infiltrated. The epithelial layer is thinner with flattened cells.

### *Trachoma Stage III*

Cicatricial changes begin at a very early stage of the disease, so that Tr. I passes rapidly to Tr. III and Tr. IV. In these cases there may be no thickening of the lid, but usually this does occur as the result, not of thickening of the tarsus itself, but of addition to the conjunctival surface of the tarsus of dense fibrous tissue, which replaces the infiltrated sub-epithelial layer. As trachoma heals, irregular strands of fibrous tissue are formed and islands of infiltration often remain for long periods within the mesh-work.

Other structures besides the conjunctiva may share in the fibrosis. Occasionally some of the accessory lacrimal glands (Krause's glands) may show signs of disorganization, fibrosis and atrophy. The tarsus may show a certain amount of infiltration, when cyst-formation from blocked ducts may occur as a result of the general fibrosis. Such damage as occurs to the Meibomian glands is by an extension of the inflammatory process *via* the ducts. Changes occur in the

epithelium which becomes epidermoid. In the more severe cases the conjunctiva becomes xerotic.

In the latest stages of severe trachoma degenerations may occur, hyaline, hyalo-amyloid or osseous.

*Conclusions*

The pathology of trachoma is that of a chronic inflammatory disease which is entirely independent of any so-called constitutional dyscrasia. The type of pathological reaction suggests a virus infection and this is probably represented by the elementary bodies of the Halberstaedter-Prowaczek Körperchen.

The disease is very protean in its clinical and pathological appearance but presents certain essential characteristics. Papillary hypertropy, follicle formation on the tarsal conjunctiva and corneal lesions invariably occur and the disease terminates in scar formation.

The author particularly notes that he has omitted any consideration of corneal and limbal trachoma, one of the most important features of the disease.

A. F. MACCALLAN.

(2) **Derkac, U. (Prelog).—The use of antimony in trachoma. (Antimon bei Trachom).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCIX, p. 311, 1937.

(2) The use of antimony in other granulomatous types of disease suggested that it might be a valuable remedy for trachoma.

**Derkac** gives the results of 50 cases which he treated with intravenous injections of tartar emetic. The drug was given as a sterile freshly prepared 1 per cent. solution. Normal healthy adults received a dose of 2 or 3 c.c. on alternate days, and weaker patients only 2 c.c. every 3rd or 4th day. Children over 10 years of age were given an initial dose of 0·5 c.c., increasing every 3rd day by 0·2 c.c. up to 1 c.c. It was considered unsuitable for children under 10 years of age. After a course of 10 doses there was an interval of 10-14 days.

There was a rapid disappearance of pannus, and a beneficial effect upon the conjunctivitis and ptosis. The best results were obtained when local application of copper stick was combined with dosage with antimony.

D. R. CAMPBELL.

(3) **Castelli (Pavia).—Treatment of trachoma by peroxide of zinc. (Il perossido di zinco. Considerazioni e risultati circa il suo uso nella terapia antitracomatoso).** *Boll. d'Ocul.*, October, 1937.

(3) **Castelli** draws attention to the value of peroxide of zinc in the treatment of trachoma; this substance was first used by

Pignatari in the Italian Hospital in San Paulo, Brasil. Though he published accounts of its success, the drug was taken up by few, and has been unduly neglected.

Its application is very simple; after local anaesthesia, for which in Pavia percaine is used because of its prolonged action, the powdered peroxide is brushed over the everted conjunctiva with a sable brush. The eye is bandaged and kept closed for half-an-hour; then the powder that remains must be carefully removed by flushing the fornices copiously with warm normal saline, aided by small swabs on glass rods; it is specially important that no powder be left at the bottom of any ulcer that may exist, since this may become a source of irritation and perhaps of danger to the eye.

HAROLD GRIMSDALE.

(4) **Meloni (Orune).—Modern ideas on the pathology and treatment of trachoma. (Contributo allo studio della patologia e della nueva terapia del tracoma).** *Rass. Ital. d'Ottal.*, May-June, 1937.

(4) **Meloni** regards trachoma as a manifestation of the adenoid condition, which spreads from the naso-pharynx to the conjunctiva. This specially affects individuals who are lacking in calcium and potassium, whose blood is insufficiently alkaline. He regards trachoma as double in nature. The primary adenoidal condition has added on to it, infection by various pathogenic organisms which take advantage of predisposed conjunctiva to flourish there. It is this part which is contagious; Ruata has attempted to treat the disease by combating these latter infections by procuring immunisation of the conjunctiva by means of vaccines of all the various strains of bacteria found to flourish in the trachomatous conjunctiva; this vaccine, "lacmin," is applied either by painting or by instillation. To lessen the acidosis, the author has treated some of his patients by "endoneutralin" and has found the Ph increased in all cases.

HAROLD GRIMSDALE.

(5) **Cuénod and Roger Nataf (Tunis).—New experimental investigations on trachoma. (Nouvelles recherches expérimentales dans le trachome).** *Ann. d'Ocul.*, Vol. CLXXIV, p. 433, July, 1937.

(5) **Cuénod** and **Nataf** maintain that the virus of trachoma is related to the rickettsia group or is carried by members of this group. The inclusion bodies of Prowaczek and Halberstaedter and the analogous small granules which are present in great numbers in the smear of trachomatous follicles are rickettsoid bodies. These bodies are to be found regularly in the intestines of lice collected from trachomatous patients, while they could be discovered only in 5 per

cent. of the lice of healthy people. The louse is credited with transmitting the trachoma virus. At least, it is a real store-house of it. As the same parasite is known to transmit typhus, the analogous geographical distribution of both diseases is a strong argument in favour of Cuénod and Nataf's views. Typical experimental trachoma could be produced in monkeys (macacus inuus) by conjunctival or subconjunctival inoculation of the intestine of lice, which had been infected with trachoma before. Likewise, the authors succeeded in producing a "wonderful" trachoma by a similar inoculation of a human eye. The period of incubation lasted ten days. The virus of trachoma could be subjected to multiple and alternating passages in the testis of the guinea pig and in the intestine of the louse without losing its pathogenic qualities.

HUMPHREY NEAME.

(6) **Federici (Bari).—Prophylaxis and treatment of gonorrhoeal conjunctivitis. (Sulla profilassi e terapia della congiuntivite gonococcica).** *Boll. d'Ocul.*, February, 1937.

(6) **Federici** holds that the use of nitrate of silver, in accordance with Credé's method, is too dangerous to be attempted by any person without special skill. He has seen many cases of ophthalmia neonatorum recover without any damage which, though being brought to him on the fifteenth day of the disease or later, have received no treatment except washing with milk, and on the other hand has seen much damage following inexpert and excessive treatment. He advises that for prophylaxis the method of Tornatola should be adopted; the lids, lashes, and neighbouring parts should be cleaned with sterile cotton wool, and then washed with sterile water, a solution of hydrogen peroxide, or boric acid. Then the lids may be gently opened and some drops of 20 per cent. argyrol instilled; the lids must be held open for some minutes. Where infection is suspected these drops may be repeated several times. Similar precautions should be taken in the adult when infection is possible.

If infection has occurred, the sac must be washed out frequently with 3 per cent. boric acid solution, and drops of argyrol instilled. In addition compresses of 1 per mille salicylic acid, at the temperature of the room should be put on for half-an-hour three times a day.

If there is oedema of the lids, and free discharge of pus, he advises injections of milk daily or every other day.

When the disease is subsiding, leaving the tarsal conjunctiva hypertrophic, nitrate of silver may be painted on the everted lids, any excess being washed away at once. He inserts in the cul de sac an ointment of 1 per cent. picric acid.

HAROLD GRIMSDALE.

(7) **Cecchetto (Verona).—Should Crede's method of prophylaxis be generally used in ophthalmia neonatorum or not? (Il metodo Créde, qulae profilassi e cura della congiuntivite dei neonati e consigliabile o no?).** *Rass. Ital., d'Ocul.*, September-October, 1937.

(7) **Cecchetto** has seen such bad results following the indiscreet use of nitrate of silver as treatment for ophthalmia neonatorum, that he would forbid its use entirely. He holds that infection during birth is very rare and that if the lids are carefully cleansed with sterile water, later infection is equally rare. If the eyes show signs of redness and discharge within a few days of birth, the bacterial content of the discharge is ascertained, and the appropriate remedies used. He holds that silver nitrate increases the virulence of the gonococcus.

HAROLD GRIMSDALE.

(8) **Lyons, Maxwell (Egypt).—Observations on the pathogenesis of spring catarrh.** Eleventh Annual Report of the Giza Memorial Ophthalmic Laboratory, 1937. Schindler's Press, Cairo.

(8) According to the Egyptian Ophthalmic Hospital Report for 1936 more than two thousand cases of spring catarrh complicated by trachoma, signified in MacCallan's classification as "Trachoma Stage IIb" were examined among the million new patients at the hospitals.

The incidence of this conjunctival hyperplasia at these hospitals was under a hundred annually from 1919 until 1931, after which it increased irregularly until it is now 2,059.

No explanation for this marked increase has been offered. Clinicians state that they now recognize many more cases than in former years.

**Maxwell Lyons**, who is working at the Memorial Laboratory of Egypt, recognizes an inherent sensitivity to explain why one person becomes afflicted with the disease and another, of the same age, sex, habits and environment escapes.

The average age of onset is between 14 and 15 years. The proportion of male to female patients affected is as 3 to 1.

In the great majority of cases in Egypt the disease begins about the middle of the summer, persists throughout the remainder of the hot weather, subsides during winter, recurring each subsequent summer, generally at a date earlier than that of the first attack. Between attacks there is a marked tendency for the lesions to clear up, but about 20 per cent. of the sufferers retain the disease in a less active form throughout the winter months.

The patient's sensitivity seems to have an allotted span, about six years, after which spontaneous cure occurs.

The fibrinous exudate, in which an excess of eosinophile cells are entangled, is well-known.

The lesions are not due to a proliferation of pre-existing connective tissue, but to an invasion of the normal conjunctiva by new fibrinous material and wandering cells, originating from the capillaries of the conjunctiva.

The author discusses the calcium content of the blood in this disease, and also the effect of the exhibition of calcium. He considers that there must be an intangible and indefinite abnormality of the capillaries. The lesions of spring catarrh are merely local manifestations of a general bodily departure from the normal.

A. F. MACCALLAN.

## II—MISCELLANEOUS

(1) **Leslie Paton.—Optic Neuritis (Retrobulbar and Papillary).** *Glasgow Med. Jl.*. December, 1937.

(1) This is the admirable Mackenzie Memorial Lecture delivered in Glasgow by **Paton** on October 29, 1937. After a brief account of the life of the greatest British ophthalmologist of pre-ophthalmoscopic days in which special attention is paid to Mackenzie's views on amaurosis, Paton pays tribute to von Graefe's original observations on the subject of optic neuritis. He goes on to describe several most interesting cases which have come under his own observation during the past 30 years. He emphasises the fact that optic neuritis is only very rarely caused by inflammations in the nasal sinuses or even in the orbit itself. "The nerve seems to possess a very strong protection against infection reaching it through its sheaths." But, in one of his cases here described he considered that the connexion seemed to be definite. In another case dental sepsis appeared to have a distinct bearing on a case of retrobulbar neuritis.

The chief part of his paper, however, is concerned with the demyelinating diseases of the central nervous system which he divides into three sections:—

1. "Disseminated sclerosis, where the patches are discrete and sharply outlined, and may occur in the optic nerve, or anywhere in the central nervous system where myelinated fibres exist. This is responsible for the great majority of cases of retrobulbar neuritis.

2. Neuromyelitis optica, or Devic's disease, where the patches are diffuse and affect mainly the white matter in the spinal cord, causing an ascending myelitis, and, in a number of cases, affecting also the optic nerves and optic chiasma.

3. Encephalitis periaxialis diffusa (or Schilder's disease), where the demyelination is diffuse and commences first in the centrum ovale of the cerebrum, and, seemingly, most frequently in the occipital lobe. In this disease, also, the optic nerves and chiasma are also attacked in quite a definite number of cases."

Most interesting cases of each of these three groups are described in this paper which should be read in the original by all ophthalmologists and neurologists.

The paper is illustrated by the fine portrait of Mackenzie which appeared in our first volume and by four pages of charts and pathological sections to illustrate the various points discussed.

Many of these cases of optic neuritis associated with diseases of the nervous system are most dramatic and we can almost imagine Mr. Paton on meeting such examples speaking to himself in the words of Bailie Nicol Jarvie when he met his cousin Rob Roy in the Glasgow tolbooth. "Ah!—eh!—oh! my conscience!—it's impossible! and yet—no!—conscience!—it canna be!—and yet again—Deil hae me!—that I suld say sae!—ye robber—ye cateran—ye born deevil that ye are, to a' bad ends and nae good ane!—can this be you?"

"E'en as you see, Bailie," would be the "laconic answer" of the disease in question.

R. R. J.

(2) **King, E. F. (London).—The Classification of the Ocular Melanomata.** *Trans. Ophthal. Soc. U.K.*, Vol. LVII, Pt. 2, p. 557, 1937.

(2) **King** describes the cellular classification of the melanomata elaborated by Callender and Wilder and that depending on the amount and distribution of reticulin. The cells which compose the melanomata of the eye fall into four main groups (1) the spindle cell type with two sub-groups (*a*) in which the nucleus has a fine delicate reticular chromatin network and (*b*) in which the nuclear chromatin is coarse and stains deeply; (2) the epithelioid type, composed of large polygonal cells of variable sizes, believed to originate from endothelial cells; (3) the fascicular type in which the cells are elongated, oval or spindle and arranged in columns along a central capillary or lymphatic; (4) the mixed cell type composed of spindle epithelioid and fascicular cells present in varying proportions in different areas of the neoplasm.

Reticulin has freely anastomosing fibrils, at some sites the branched cells of the reticulo-endothelial system are wrapped round the fibrils, it stains poorly with ordinary stains but is well differentiated by silver preparations. Reticulin may be revealed in specimens which have been embedded in celloidin for a considerable

time by preliminary sensitisation with uranium nitrate. The author has found it advisable to bleach all sections before using the silver stains.

The distribution of reticulin is variable (1) no fibrils at any site, or only in the stroma between lobules of tumour cells; (2) areas of neoplasm with and without fibrils sub-divided into (*a*) neoplasms with a preponderance of areas without fibrils (*b*) tumours in which areas with fibrils preponderate (*c*) neoplasms in which areas with and without fibrils are approximately equal; (3) fibrils between individual tumour cells throughout the whole mass.

The prognosis of the melanomata depends on their cytological character and the amount and distribution of their reticulin content. The spindle celled neoplasms give the most favourable prognosis, then the fascicular, the epithelioid and the mixed celled about equal. The presence of the so-called epithelioid cells alone or with other cell types gives the highest mortality rate. When all areas of the neoplasm contain reticulin fibrils no metastases occur and the patients were alive after five years; when some areas were without fibrils metastases followed in 36 per cent. of cases, and 68 per cent. died within five years and when no fibrils were present except in the inter-lobular stroma all the patients had died. It seems that reticulin must operate as a mechanical barrier against the neoplastic cells entering the blood vessels. It is therefore essential that every specimen of melanoma of the eye should be examined for its reticulin content and distribution for the purpose of prognosis.

H. B. STALLARD.

(3) **Suganuma, S. (Tokio).—The anatomical state of an eye affected with juvenile recurrent haemorrhage into the vitreous, associated with tuberculous sclero-keratitis. (Ueber die anatomischer Befunde eines Augapfels mit juveniler rezidivierender Netzhautglaskörperblutung, zu welcher die Sklerokeratitis tuberculoser zugesellte).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCIX, p. 367, 1937.

(3) It has been disputed whether recurrent retinal haemorrhage in young persons is due to a primary tubercular infection of the vessels, or to a primary thrombo-angeitis obliterans.

**Suganuma** describes the case of a girl, aged 21 years, with recurrent intra-ocular haemorrhage in one eye, which later developed scleritis and tuberculous iritis and had to be enucleated on account of secondary glaucoma. She had apical phthisis. Section showed several circumscribed tuberculous spots in the neighbourhood of the retinal vessels without any thrombosis of the latter. There was definite tubercular infection in the anterior part of the eye.

D. R. CAMPBELL.

(4) **Bishop Harman, Sorsby, A., Thomson Henderson et alia.—Discussion on the problem of Myopia.** *Trans. Ophthal. Soc. U.K.*, Vol. LVII, Pt. 2, p. 366, 1937.

(4) In opening the discussion on myopia at the Oxford Ophthalmological Congress **Bishop Harman** commented on the hereditary factor in myopia and the effects of social conditions such as deficient diet, overcrowding and bad hygiene which lead to an increase of this refractive error. It appears that Sweden has reduced the incidence of myopia in school children by 20 per cent. through improved lighting conditions and better and further facilities for outdoor exercise. The incidence of short-sight is less on the modern side than on the classical side where dictionaries are extensively employed.

He states that myopes between 20 and 60 years of age deteriorate more rapidly in occupations involving close work if the principles of ophthalmic hygiene have not been carried out during the years of school life than would otherwise be the case if these precautions had been taken.

**Arnold Sorsby** criticised the nineteenth century view of myopia as being due to a mechanical increase in the axial length of the globe. He believes that low and medium myopia is non-pathological and non-pathogenic but the higher degrees some of which progress to macular degeneration and retinal detachment are pathological.

In the discussion that followed Beatson Hird stated that there was insufficient evidence to regard calcium deficiency as a factor in progressive myopia. In a study of 3,500 consecutive cases of myopia he found retinal detachment in 0·7 per cent., 72 per cent. of whom were over 40 years of age and in four out of 25 persons thus affected both eyes were involved. Macular degeneration was present in 3·8 per cent., 63 per cent. of whom were over 40 years of age, and 7 per cent. had over 10 D. of myopia.

Williamson-Noble said that there were two types of myopia, one which was associated with growth of the whole globe and the other was due to stretching of the posterior segment of the globe when it was unsupported by the extra-ocular muscles.

Harrison Butler supported the conception that heredity plays a part in myopia and that this refractive error is aggravated by adverse social conditions.

H. B. STALLARD.

(5) **Motelese and Berardi (Florence).—Heredity in ocular disease.** **(Nots sull' eredita nelle malattie oculari.)** *Boll. d'Ocul.*, November, 1937.

(5) The authors have examined the refractive errors in a number of families, including the parents and the issue. They conclude that

corneal astigmatism (not including that due to scarring) is hereditary and may be transmitted by either parent to the children without distinction of sex. They are not able to say whether astigmatism is a dominant since there are observations for an insufficient number of generations.

It will be noted that the form of astigmatism and the degree frequently differed between the parents and the second generation. Thus in some cases the astigmatism was "with the rule" in one generation and "against the rule" in the other. Sometimes the amount varied much, thus in Family XXXII the parents are nearly emmetropic; 0·50 D. cyl. only; one son has an −4·50 D. Since it is a matter of every day observation that families have a "likeness," it might be expected that there would be similarity in the shape of their eyes.

HAROLD GRIMSDALE.

(6) **Campos (Naples). — Experimental research on papillary stasis. (Ricerche sperimentali sulla papilla da stasi).** *Arch. di Ottal.*, April and May, 1937, pp. 221-246 and 267-293.

(6) **Campos** has investigated the mechanism of the production of papillary stasis, by ligaturing the optic nerve in different positions, and noting both the ophthalmoscopic appearances following, and the microscopical changes in the state of the nerve. There are naturally great differences between the early changes seen when the vessels are included in the ligature; the immediate stoppage of the circulation produces intense venous stasis, and numerous haemorrhages round the disc; later there is oedema from interference with the lymphatic flow. Roughly the time necessary for the development of papilloedema varies with the distance of the ligature from the globe. The nerve on both sides of the ligature shows oedema, extending much further on the distal side than centrally; and when the ligature is placed far behind the point of entrance of the vessels into the nerve, the oedema often stops abruptly there. The nerve sheaths also, show changes; the intervaginal spaces are largely obliterated partly by the swelling of the nerve, partly by inflammatory changes in the sheaths themselves. If an opening be made in the sheath, the swollen nerve will be seen to bulge into the gap, and papilloedema will come on as usual unless the ligature is very far back and the opening large; in this case the appearance of papilloedema will be delayed and its intensity lessened.

The author gathers from these observations that there must be a current of lymph from the eye centrally along the nerve, and that the interference with this flow has an important part in the production of papilloedema; he compares the results of his experiments with that of Dimissianos, who found that by injecting paraffin into

the orbit so as to compress the nerve where it contained the vessels, he produced papilloedema.

It is easy to explain the onset of papilloedema when the central veins are compressed; there are difficulties in determining the cause when the venous flow is little affected. Campos thinks that many factors may enter into the production; the compression of the vessels where they pass through the sheaths of the nerve may be aided by the oedema of the nerve spreading from the brain, or brought about by the stoppage of the lymph flow in the nerve.

HAROLD GRIMSDALE.

(7) **Raab, K. (Budapest).—On the so-called "Recovery-point." (Zur Frage der sog. Refusion).** *Klin. Monastbl. f. Augenheilk.*, Vol. XCIX, p. 475, 1937.

(7) **Raab** describes the variability of the "recovery-point" in convergence tests; as convergence is increased there comes a point at which the image becomes blurred and then diplopia occurs. By weakening the prisms (*i.e.*, lessening the convergence) the two images are "re-fused"—this is the recovery point. The author finds that (1) The position of the recovery point depends on muscle tone, which shows individual differences; (2) The position of the "blurring point" which is the higher limit of relative convergence, indicates that increase of tonus is possible; (3) Certain individuals show a primary and secondary "recovery point." The position of the primary depends on the persistence of over-accommodation convergence; the second depends on muscle tone. (4) Two types of convergence insufficiency can be distinguished—a simple hypotonic form, and a hypotonia compensated by accommodation. (5) The curves for the "blurring" and "recovery points" do not usually cross one another.

D. R. CAMPBELL.

(8) **Jess, A.—Temporary indentation of the sclera as a surgical measure in the operation for detachment of the retina. (Tempörare Skleral-eindellung als Hilfsmittel bei der Operation der Netzhautablösung).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCIX, p. 318, 1937.

(8) **Jess** describes the use of a tampon to produce temporary pressure outside the sclera after diathermy round the site of a retinal hole, and removal of the subretinal fluid by oblique puncture with a hypodermic needle. The tampon is inserted inside Tenon's capsule, and is secured by sutures which are led out through the conjunctiva. It is left *in situ* for fourteen days and removed under a local anaesthetic.

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# BOOK NOTICES

**Die Formenwelt des Tastsinnes.** By G. RÉVÉSZ, Professor of Psychology in the University of Amsterdam. Two Volumes. Pp. 291, + 293, with 52 + 115 Figures. Haag: Martinus Nijhoff. 1938. Price, Gld. 9.80; Cloth, Gld. 12.

The psychology of space perception is one of the most fascinating, as it is one of the most complicated, problems of psychology. No apology would be needed for a consideration of the appreciation of form by the sense of touch in a Journal of Ophthalmology, for the correlation of the data derived from touch and vision is the foundation of space perception. Indeed, in the past, there has been too great a tendency among psychologists to neglect the importance of this correlation. Professor Révész's treatise removes this reproach, for he has realized more fully than others that the purest material for the investigation of unadulterated tactile phenomena is to be found in the experiences of those who have been born blind. A small proportion of those born blind are amenable to operative treatment, and these provide invaluable material for the investigation of the effects of dawning vision on the minds of those whose space perception has been formed almost entirely from tactile stimuli. It is the more necessary that these cases should be exhaustively studied by competent psychologists, because very few such are likely to be added to the already meagre list; for it is only rarely nowadays that an operable case is left alone until an age when the mind has developed sufficiently to make psychological investigation fruitful.

In the first volume Professor Révész has dealt principally with the fundamental problems of the psychology of space, and those of touch. In the latter section, there is a thorough examination of the contributions of tactile sensations to the knowledge of space, of things in themselves, of form, and of structure. Here we have a masterly exposition of the information derived from passive and active touch, of the moving hand, and of kinaesthetic "sensations." It is pointed out that the tactile sensations build up a world of space which is very different from the visual world of space. Whereas the former results from an integration of isolated tactile impressions, often resulting in inaccurate ideas of size and structure, yet dealing essentially with structure, the latter gives an immediate impression of the thing observed as a whole in its relatively complete proportions and shape. The former is analytic, the latter synthetic. Haptomorphic tactile objects differ fundamentally from optomorphic tactile objects. In this section the author does not devote as much

attention as might be desired to what may be called auto-tactile impressions, *e.g.*, those of a child exploring the surface of its own body with its hands. These provide the fundamental empiric data for the relationship of self and environment.

The major part of the second volume deals with the creative activities of blind sculptors, and emphasizes the difference in modelling of those born blind and those who have become blind in later life. No such exhaustive study has previously been made, and the illustrations demonstrate the high degree of artistic skill which can be attained by the blind.

No psychologist—or philosopher, for that matter—can afford to neglect this treatise; and every ophthalmologist should be interested in it.

**Medical Annual, 1938.** Bristol: John Wright and Son, Limited. Price, 20s.

The 1938 edition of this publication has attained its usual high standard. The contributions are from authors of repute in various branches of medicine and surgery.

The sections on ophthalmic matters are from Sir Stewart Duke-Elder. He has described some modern conceptions about conjunctivitis and allergy; staphylococcal infections of the conjunctiva and their treatment by active immunization or desensitization with staphylococcus vaccine; and the work of Busacca, Cuénod and Nataf concerning trachoma and Rickettsiosis.

In the section on corneal grafting Duke-Elder discusses Filatov's work of employing corneal transplants taken from the eyes of cadavers which have been stored at ice-chest temperatures (4—6 C.) in a jar containing some of the donor's fresh clotted blood or citrated blood. The eyes were thus kept for 10—56 hours.

The results of the surgical treatment of glaucoma are set out and it is interesting to note that late infection of a corneo-scleral trephine is very rare and that in 98·2 per cent. of persons operated on by this method the intra-ocular pressure becomes normal.

Duke-Elder has also quoted certain authorities who have shown that the reduction of the visual field to the fixation point is not a contra-indication to operative treatment.

The pathology of retinal detachment is described particularly in regard to cystic degeneration, the developmental basis in some cases and hereditary and predisposing factors in myopes. The treatment of this disorder by electrolysis is discussed.

In the section dealing with squint Conrad Berens' review of 223 cases treated by (1) Surgical operation with no pre-operative or

post-operative orthoptic training, (2) Surgical operation with post-operative orthoptic training, (3) Pre-operative and post-operative orthoptic training and surgical operation is considered.

It is evident from Berens' statistics that the best results are in group 3 who received pre- and post-operative orthoptic training and had a surgical operation. It is also interesting to note that this author is in favour of early operation at the age of 3 or 4 years.

The Annual is admirably printed and produced and the illustrations are excellent.

**External Diseases of the Eye.** By DONALD T. ATKINSON, M.D., F.A.C.S. Consulting Ophthalmologist to the Santa Rosa Infirmary and the Nix Hospital, San Antonio, Texas. Second Edition. Pp. 668, Illustrations, 494. London: Henry Kimpton. 1937. Price, 36s.

The author has set out to describe those diseases which affect the anterior segment of the eye and which may be detected without the use of the ophthalmoscope or other special and elaborate instruments. He points out that the majority of eye diseases for which the general practitioner will be consulted affect those structures which are readily available for external examination.

This work is fully illustrated by drawings and photographs of wax models and casts showing certain pathological disorders and many of these have been skilfully prepared by the author himself. Some are good but others fail to demonstrate fully and clearly the salient features of the disease they intend to show and in some of the drawings of operations the technique illustrated is not that which would meet with the approval of the majority of ophthalmic surgeons in this country.

Sections are devoted to history taking, the keeping of case records and therapeutic remedies.

The second edition has been carefully revised and additions have been made on slit-lamp microscopy, orthoptic training and allergic ocular disorders.

This work will interest the general practitioner and the descriptions on yaws, leprosy and other tropical disorders affecting the eyes will interest the ophthalmic specialist.

The printing and production are good.

# NOTES

**Blindness in Denmark**

IN a recent letter to one of the Editors Dr. Gordon Norrie, of Copenhagen, says that he has lately retired after 35 years' service as surgeon to the Royal Institute for the Blind. His experiences are not only interesting but most valuable. He has examined and treated 900 blind children between the age of 8 and 18 years. And in 1927 he gave an account of 25 years' work in *Acta Ophthalmologica.*

There is no blindness in Denmark from small-pox, vaccination having been compulsory since 1810. Dr. Norrie informs us that there has been some slight relaxation in this matter during the past few years. And there is no blindness from trachoma among the Danes. In August, 1923, Dr. Norrie contributed a paper on "Blindness from ophthalmia neonatorum in Denmark" to this Journal. He says that he fought hard for the introduction of Credé's method from 1886 to 1900. In the latter year the Royal Board of Health ordered midwives to use a solution of silver nitrate (1 in 150) at every birth. In Denmark the midwives assist at nearly every delivery. They have two years hard training before their examination and Dr. Norrie vouches for their ability. The first law for midwives in Denmark dates from 1714 and the protocol now in use is 199 years old.

Forty-two of the blind children born between 1892 and 1906 were blind from ophthalmia neonatorum. In the last 15 years there have been only five cases; in the last five years, only one case, and in the last four years, none. The last case he saw was probably infected after birth. Denmark is to be congratulated on these results. As Dr. Norrie says "it is seldom that one lives to see such results—but it is also seldom, that one is young, when one is 83 years old!" *The British Journal of Ophthalmology* would like to send their best congratulations to the Peter Pan of ophthalmology. Another interesting observation which he has made is the connexion between phlyctenular ophthalmia and pediculi capitis. Fifty years ago he treated large numbers of these cases daily and now he has not seen a case for several years. The result is largely due to the introduction of school nurses in the schools in Copenhagen.

Another interesting series of observations deals with xerophthalmia. In 1889 Dr. Norrie recorded a case in Danish which was also published in the *Centralbl. f. pract. Augenheilk.* in 1890. During the years of the Great War they had many cases of xerophthalmia in Denmark. From 1913-1933, 100 cases were

received in the Institute for the Blind: in the past five years only 11, but there is still too much and Dr. Norrie is hopeful of better results with new health regulations and inspection of babies.

We feel sure that our readers will be interested to read this abstract of the reminiscences of one of the doyens of the ophthalmological fraternity. We wish that other aged members of the fraternity might be induced to record their own professional reminiscences.

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**Appointments**

MR. ADRIAN CADDY, F.R.C.S., has been appointed by the Royal College of Surgeons as an examiner for the D.O.M.S., Part II.

MR. J. MINTON has been appointed Honorary Ophthalmic Surgeon to the Queen's Hospital for Children, Hackney Road, London.

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**Glasgow University. Lectures in Ophthalmology**

ON Tuesdays, September 6 to October 11, inclusive, Professor A. J. Ballantyne and Assistants will deliver a short course of Lectures on the Nature (including Pathology and Pathogenesis) of certain Diseases of the Eye:—Glaucoma, Cataract, Retinitis, Keratitis, Ocular New Growths.

The Lectures will be given in the Eye Department of the Western Infirmary (Tennent Memorial, Church Street), at 4.30 p.m.

All graduates are invited.

## FUTURE ARRANGEMENTS

### 1938

*October 7*—Midland Ophthalmological Society, at Birmingham and Midland Eye Hospital (Annual Meeting).

# CONTEMPORARY OPHTHALMIC LITERATURE

## American Journal of Ophthalmology. *July, 1938.*

FRIEDENWALD and MCKEE. Agent of endophthalmitis.
RAMBO. Effects of sulfanilamide on rabbits' eyes.
CUTLER, JAFFE and GROSSMAN. Irradiation of the eye.
SALIT. Water content and solids of human lenses.
L. J. and R. FERNANDEZ. Sulfanilamide in gonorrheal ophthalmia.
SCHULTZ and O'BRIEN. Retinal changes in hypertensive toxaemia of pregnancy.
NELSON. Contact lenses.
RAINEY. Removal of large foreign body from the vitreous.
SHAPIRA. Cyanosis retinae.
BERENS. Stereoscopic cards in colour for children.

## Archives d'Ophtalmologie. *July, 1938.*

ARGAUD and CALMETTES. Considerations on glioma retinae in an infant of 16 months.
RENARD and HALBRON. Palpebral manifestations of tertiary syphilis.
KELLER. How to realise social, rational and efficacious trachoma prophylaxis in Indo-China especially in Tonkin.

## Annales d'Oculistique. *June, 1938.*

BOLLACK, DELTHIL and OFFRET. A particular form of unilateral optic neuritis. Segmentary neuritis.
ADAMANTIADIS. Two cases of recurrent retrobulbar neuritis.
VIANNA. A case of convergent strabismus with divergent strabismus apparent in the deviating eye.
BISTIS. Obliteration of the retinal arteries and retinal arterial hypertension.

## Archiv. für Ophthalmologie. *July, 1938.*

GREEFF. What knowledge have we of Albrecht von Graefe? Supplement.
SCHMIDT. Scleral fibroma.
JOHN and HAMBURGER. Results of attempt to breed trachoma and para-trachoma virus.
BÖCK. Jaundiced discolouration of the cornea.
SIEGERT. The significant cause of calcification or thrombosis of the internal carotid in ocular functional disturbances.
KRÜMMEL. The nerves of human ciliary bodies. A contribution to the neuro-histology of the smooth musculature.
CATSCH. Correlation pathological researches. The correlation of acquired and embryological disorders of the eyes.
SERR. The present position of the estimation of the blood pressure in the intra-ocular arteries.

## Klinische Monatsblätter für Augenheilkunde. *June, 1938.*

NIZETIC, SPIRIDONOVIC and BUKUROV. Periarterial sympathectomy of the common and internal carotid arteries with removal of the carotid body. Its influence on the degenerative process in the retina and atrophy of the optic disc.

WAGNER. A hitherto unknown disease of the eyes (Degeneratio hyaloideo-retinalis) observed in the canton of Zürich.

TERTSCH. Bilateral ocular changes from a fracture of the base of the skull.

GLESS. The Foster Kennedy syndrome, similar changes of the optic nerve through arteriosclerosis.

JESE. Keratitis nummularis.

SAGHER. Primary bandlike corneal degeneration.

LISCH. Polycoria.

NIZETIC. Surgical treatment of traumatic iridodialysis.

OLÁH. Puncture wounds of the ciliary body.

VON HORVÁTH and NÉMETH. Visual field examination with a lighted perimeter.

## Bollettino d'Oculistica. *May, 1938.*

BENCINI. Essential shrinkage of the conjunctiva.

FOSOSI. The presence in the aqueous humour of a volatile aromatic substance and the determination of the respective quality in the blood serum.

OTZALESI. Optic neuritis; its retrobulbar prevalence and the obscure aetiology in the course of a psoriasis.

BIETTI. Results of the interfero-metric method in the oculo-endocrinological field.

BARATTA. Experimental research on the action of simpamine (phenyl-isopropyl-amine) on the human eye.

## Rassegna Italiana d'Ottalmologia. *March-April, 1938.*

FAVALORO A personal contribution to the histogenesis of the neuroglia.

GALLENGA. Cataract operation in congenital aniridia.

SIOTTO. Melanoma of the lacrymal caruncle.

ANGIUS. Primary histiocytoma of the orbital portion of the lacrymal gland.

COSSU. A case of Marcus Gunn's palpebro-mandibular synkinesia.

RAVERDINO. The application of millimetre peri-limbal circles for the radiographical localization of foreign bodies.

DENTI. Glioma retinae with iris metastases and hypopyon.

## Archivio di Ottalmologia. *May-June, 1938.*

CORDERO. The action of *a*-dinitrophenol on the eye. Experimental research.

CAVALLACCI. Some cases of endocrine cataract.

## Klinika Oczna.

STARKIEWICZ. Secondary images.

HERSCHENDÖRFER. An orbital plastic operation.

KOZIOWSKI. Epidemiology of trachoma.